Equipment Review

INTERNATIONAL

DXer's Club of San Diego

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SHORTWAVE HOBBY EQUIPMENT REVIEW 1981

Larry Brookwell, President
International DXer's Club of San Diego

FOREWORD

This is a compilation and review of articles that appeared in the SDDXC Bulletin since its inauguration over three years ago in June 1978. Occasionally you will find the same equipment reviewed or evaluated more than once. This indicates either an excusable change of mind or the result of further testing or information from other users. It demonstrates that first impressions are not always the most reliable.

This is a revised edition, and the author acknowledges the invaluable assistance of SDDXC member Joe Mazzini (R-390A, ICF-2001) of Montgomery Creek, CA in correcting my awful English, bad spelling and other errors and also for his expert typing and reassembly of the contents. No changes of the basics have been made.

The author makes no claim as to technical expertise nor to the accuracy of the contents. The opinions expressed are those of the author unless otherwise specified. Actual mistakes are due either to lack or misunderstanding of available data. Criticisms are honestly made. Technical jargon has been avoided to aid the uninitiated. Technical specifications are less important than actual performance.

For further information and evaluations, the Club membership fee and subscription to the monthly Bulletin is $10.00 in North America and $17.00 (US funds) overseas airmail. A sample copy of the SDDXC Bulletin is $1.00, and a reprint of a back issue is $1.50.

Each January, a Supplement containing articles which have appeared in Bulletins subsequent to the compilation of the 1981 Review (or a previous supplement) will be sold for $2.75 ppd.; $3.35 Canadian currency; $3.75 South America & Europe; and $4.10 elsewhere.

The Equipment Review sells for $5.95 3rd Class; $6.25 First Class in USA, Canada & Mexico; $7.10 to Central America, Colombia, Venezuela & Caribbean; $7.90 to South America, Europe & North Africa; $8.75 elsewhere, all airmail (US funds only).
Note: IRCs accepted in lieu of cash at 30¢ US each

Receiver Basics: The three most important requirements of a SW receiver are sensitivity, selectivity and the ability to determine the frequency accurately. Even the most reasonably priced present-day receiver will be sufficiently sensitive for normal use. Selectivity, however, is generally governed by the price: the least expensive having only mediocre selectivity and requiring modification for serious DXing. Accurate frequency readout is very important, and an inadequate system can spoil an otherwise satisfactory receiver. The best method is known as digital frequency readout. However, this method is costly to manunfacture and may be found only on receivers costing over about $400.00. This is not true with portables as Panasonic has two models just over $200.00.

Sensitivity of a receiver can vary according to frequency, and some units will be good on shortwave while being poor on LW/MW or vice versa. Naturally, overall sensitivity is most desirable and will determine resale value.

Selectivity is the mark of a good receiver and is essential for serious SWLing or DXing. The true test of an adequate selective receiver is its ability to separate two signals 5 kHz apart, especially if the weaker of the two signals is the one wanted. Only a very few receivers can do this satisfactorily without modification (addition of sharper IF filter(s)).

Receivers not equipped with digital frequency display differ considerably in methods of analog readout and vary considerably in accuracy and ease of operation. Some rereceivers have only 10 kHz divisions in frequency markings, better receivers cut this in half with 5 kHz marks, with professional rigs reducing this to 1 kHz or even 100 Hz. An example of the inadequate 10 kHz marking is the Yaesu FRG-7, an otherwise excellent receiver with fair selectivity and probably the most modified receiver because of its superior performance otherwise.

The most common method of tuning with an analog frequency display uses a main tuner covering 1000 kHz and a bandspread dial which covers a segment of that 1000 kHz. Some rigs have an extra vernier or "fine tuner" control. Naturally, the accuracy of the display with these controls determines the efficiency of the system. To check this accuracy one can tune to a known frequency such as WWV, but the best method is the use of a crystal calibrator (sometimes a built-in feature of the receiver). Outboard calibrators are also available. Several of the better rigs supply a method of adjustment of inaccurate dial readings mechanically.

None of the analog readings mentioned can be relied upon for accuracy unless the operator can check the "main" tuner setting with a "fixed" frequency. WWV is accurate but appears in only a few places in the entire spectrum, so the resort to a crystal calibrator is almost essential.

Another feature very important is the adequacy of the bandspread feature. (Is there enough spread?) An example of inadequacy is the Realistic DX-200 which supplies only a ½" space in the 25 meter band and also fails to completely cover two bands (60 and 90 meters). A very bad example of poorly-designed analog display is the Realistic DX-100, and otherwise very hot little receiver with good selectivity and sensitivity. Finding a "new" frequency on the display without an outboard digital readout is only guesswork and returning to a logged frequency without a crystal calibrator is almost an impossibility.

Other receiver features such as preamplifiers, attenuators, RF gain, AGC choice, BFO pitch, etc. are all nice additions and aides to SWLing but are not "basics."

FREQUENTLY USED TERMS WHICH MAY NEED EXPLANATION TO SOME

Superheterodyne: Most commonly used SW Receiver Circuit.
Single, Dual & Triple Conversion describes complexity of Superheterodyne circuit, the latter generally being superior with greater sensitivity and selectivity.
PLL (Phase Locked Loop): Advanced circuitry found in most expensive receivers such as Racal, Drake, etc., but now used in medium priced gear such as DX-302, Yaesu FRG-7 and FRG-7000. PLL appeared in a portable by Barlow Wadley made in Africa where the circuit was called the Wadley Loop.
Synthesized: Term describes tuning method which eliminates individual crystals for each frequency band.
ECSS (Exalted Carrier Selectable Sideband): Method of tuning on receivers equipped with variable BFO control. Consists of tuning within the null between heterodynes bracketing an AM signal. Produces practically noise-free, sharp signal with poor audio but readable for ID.
BFO (Beat Frequency Oscillator): A necessary function of a receiver able to receive SSB, CW and RTTY. When activated, an AM signal has a squeal on both sides (heterodynes). It is in the dead spot between these heterodynes where ECSS

tuning is accomplished. Also, weak signals can be located on the dial when the BFO is engaged.

Shape Factor: Shape of skirt of IF filter measured in ratio between -6dB and -60dB. Closest to 1 to 1 most effective. Example: 4 kHz at -6dB and 10 kHz at -60dB= factor of 2½-1.

Analog Dial: Mechanical frequency display as opposed to a *Digital Readout:* Electronic Digital display of tuned frequency in LED or flourescent numerals.

Mode: Type of reception such as LW, MW, SW, FM, SSB, CW, etc.

Bandwidth: Reduced section of frequency spectrum or tuning range. Also indicates selectivity in kHz.

SWL/DX/QSL: Shortwave listening as opposed to DXing. The SWL is interested in the program. The DXer in identifying the station, and in some cases, collecting QSL cards (proof of reception supplied by the station).

Ferrite Rod Loop Antenna: Many receivers have this device (black rod wound with wire) as a built-in antenna. In some cases it is a rotatable cylinder on top of the receiver. This is an LW and MW antenna for portable use. A broadband outside antenna can be used in addition to this Ferrite Rod, but an active antenna cannot except by placing the active antenna loop, or rod-loop, parallel with the receiver's own antenna. No physical connection need be made to the receiver. This method permits tuning the receiver's antenna to the signal (by rotation) and the active antenna to null interference.

"S" Meter: Very few medium priced receivers have a true "S" meter which registers in "S" units and decibels over nine. The usual meter is a combination of a signal strength indicator and a battery tester. Many strength meters will hit the peg with any strong signal. They are useful when tuning but of no use when reporting as there is no standard established like with a true "S" meter.

AGC or AVC: Automatic Gain or Volume Control on the better receivers has three positions: fast, medium and slow. Its purpose is to control fading and surge, supposedly holding a signal steady. A very slow setting can blank out reception when lightning strikes nearby; and a fast setting can create abnormal reception. Except in certain conditions, the medium setting is recommended.

Stability or Drift: Lack of drift is an indication of a well constructed receiver. A frequency creeping up or down after being tuned in requires constant retuning. Most good receivers have a slight drift for the first few minutes of operation. This is known as the "warm up" period and is indicated in most receiver specifications. Receivers with a drift problem are a nuisance and are avoided if SSB, CW or RTTY is to be received. These modes require critical tuning and a drift cannot be tolerated.

Antennas: A big subject where invention and innovation is required. Space availability is the controlling factor. The most common antenna, and probably the best and most practical, is the Inverted "L" or Longwire (50 to 100 feet of horizontal wire stretched between two supports, as high as possible, and with a lead-in wire going as directly as possible from one end to the receiver). My personal "rule of thumb" is that height is more important than length. With less than a 50 foot span, use a regular wire lead-in as short (direct) as possible, and with a longer span, coax should be used to reduce ground hugging interference. Most man-made static stays close to the ground and has a vertical polarity and loves unshielded vertical lead-ins. Those without space for a longwire can use a tuned vertical antenna with a ground plane, which has been popular, but the active antennas such as the Radio West All Band Model KRS or the McKay Dymek DA-100 have proven to be superior. They consist of a 6 foot whip (approx.) with an amplifier at its base to be mounted on the roof, and a beside-the-receiver unit to supply power and control the signal. Those restricted to inside antennas only have a choice of a wire in the picture molding or the same active antennas mentioned above. The whip can be attached to a balcony railing or awning, or placed in the room in a spot proved best by experiment. Also, try the attic.

Ionosophere & Propagation: Atmospheric conditions which affect radio reception requires lengthy explanation. Lacking the explanation, you can blame poor reception on solar activity. The Bulletin will soon publish an article covering the subject in detail.

WWV & Time Stations: U.S. Government time and frequency service broadcast from Ft. Collins, Colorado on 2500, 5000, 10000 & 15000 kHz 24 hours a day. WWVH, on the same frequencies plus 25000 kHz, is located in Honolulu. Canadian time signals appear on 3330, 7335 and 14670 kHz. Other time stations in foreign countries will be encountered as you turn the dials. Aside from correct time, these signals are used as frequency standards to calibrate dial readings. WWV also gives periodic propagation information.

Selectivity: A receiver with good selectivity is able to separate signals only 6 kHz apart. This requires an IF filter, either supplied with the receiver or added as a modification, of approximately 2.9 kHz with a shape factor of less than 2-1. Very few receivers are so-equipped, so modification is required. In most cases such a modification also requires additional amplification to compensate for a natural loss caused by the sharper filter. Selectivity can be increased somewhat with the use of the RF gain control and considerably with ECSS tuning. It will be found that, in all but the very expensive receivers, tone quality will be sacrificed for selectivity. A filter of 1.8 kHz is about as sharp as can be handled for AM reception, and the audio will be unsatisfactory except for ID purposes only. The ideal receiver permits selection of a number of selectivity choices.

Sensitivity: The ability of a receiver to capture and amplify weak signals. Most receivers have varying sensitivity according to the frequency being received. Some do well on SW but fail miserably on LW and MW. Others handle frequencies up to the 49 meter band but are poor on the tropical bands. You can recognize these variations in the specifications given in product literature. It is difficult to set a standard as many factors enter into receiver sensitivity. A mediocre receiver can outperform an expensive one if it has a superior location and a better antenna and an experienced operator. Sensitivity can be increased with the use of a Preselector, which, in most cases, consists of tuned RF amplification.

Image Rejection: Images are false signals created within the circuitry of the receiver and are usually caused by front end overloading. In most cases this can be controlled or reduced by attenuation of the antenna circuit. Some receivers are equippped with an attenuator or an antenna tuner can be detuned or the RF Gain reduced. A home-made attenuator can be formed by cutting the anttenna lead-in and twisting the ends together lengthwise. A jumper around this twist will return the antenna feed to normal. Other images are ghosts of signals on other frequencies which are products of poor circuitry. Most receiver literature lists image rejection values and should be considered when purchasing.

Crystal Calibrator: Some receivers have built-in crystal calibrators which are used to correct dial settings. The device produces a tone on a specified frequency enabling the user to correct dial readings. Lacking a crystal calibrator, the user resorts to WWV signals for calibration.

Outboard Helpers: An Antenna Tuner electrically shortens or lengthens your antenna so it will resonate on a desired frequency. A so-called Preselector, or tuned preamplifier, will increase the signal strength received on your antenna. A Preselector Pre-Amplifier connected to a 105 inch CB whip makes an acceptable Active Antenna. A true Preselector performs as a combination antenna tuner and a preamplifier as well as a means of improving the selectivity. It can be either passive (un-amplified electrically) or active. McKay Dymek manufactures a passive unit and Radio West is about to release an active Preselector. An Audio Filter enables the hobbyist to eliminate unwanted audio frequencies. It adds selectivity to the speaker circuit. My experience has shown that the audio filter (I have an Autek QF-1A) to be most useful when used after the signal has been captured on tape. An attempt to clarify or improve a fleeting signal on the air can lose you the ID. When safely on tape, you can play the signal over and over again while you explore the capabilities of the audio filter. It works. I have succeeded in untangling a bad signal to the extent where it can be entered into my "Hall of Fame" collection of taped IDs and ISes.

Scanning: Method of tuning practiced mostly by VHF/UHF monitors, those fans of the "Over Thirty" frequencies. It is a receiver which can be set to scan, or automatically tune in predetermined steps at a predetermined speed a chosen portion of the high frequency bands. The "hunt and peck" method of tuning in these spectrums would be tedious because there are thousands of active frequencies to be sought. This scanning feature is now appearing in some of the latest microcomputer SW receivers which are coming up over the horizon (from both East and West).

Note: This excursion into the basics have been for the benefit of members who are newcomers to the hobby and I ask indulgence of those knowledgeable gentry who will be bored with it all. I can tell you I wish I had been subject to a similar exposé when I was a neophyte.

Outdoor Antennae for VHF/UHF Scanning: Although the most satisfactory outdoor antenna arrangement for VHF/UHF reception consists of three antennae (one for each band) many afficionados will opt for an all-band unit which is a compromise. In my evaluation of the Bearcat 300 in Bulletin 26, I mentioned that a Radio Shack Archer tribander failed to show much difference from the small whip supplied with the receiver. Learning that the Archer antenna was not considered top-notch, I purchased an Avanti AV-801 Astro-Scan base station antenna and installed it with a quick-change switch for a comparison. (I didn't think to try disconnecting the outside antenna when my Portugese friend was bothering me.) I learned that the receiver whip must be removed when using an outside antenna (upsets the resonance) and that the Avanti antenna is much superior to the Archer trident.

The small whip supplied with the receiver does a surprising job, and the value of an outside antenna is only apparent when weak signals are encountered.

Evaluation of Joystick VFA & ATU Indoor Antenna System by charter member Dan Sheedy of Encinitas. Of special interest to apartment dwellers and others with antenna restrictions, Dan has supplied a quite long and amusing article on this well-known accessory. I have had to cut it down because of space limitations and ask forgiveness for so doing.

Partridge Electronics Ltd, Broadstairs, Kent, England offers two models of their Joystick Variable Frequency Antenna and Matching Antenna Unit. System "A" sells for $84, air-post paid, and System "J" for $110. Dan is not sure what the difference is and suggests requesting a brochure from Partridge to find out (2 IRCs for airmail).

The three section whip antenna is 7½ feet tall, of threaded aluminum tubing. The central section contains a sealed loading coil and is designed for indoor use. Connected to this by coax cable (supplied) is the ATU, or box of mystery, containing a series resonant circuit (LC) consisting of a tapped coil and a variable capacitor. The mystery is how this unamplified tuner can produce a resonant signal from the 7½ foot whip that competes with an outdoor antenna. However, it does, and Dan suggests it could be voodoo in the loading coil in the whip. Dan warns that the coax cable is just shoved into the banana plug connector. Don't yank on the cable. Best to heat up the iron.

Dan claims his Joystick produces results equal to a 100-300 foot outside antenna (sic). He works an SPR-4 and an FRG-7. To me, it is very interesting that this rather simple arrangement (but not cheap) performs as it does. This is not a new product and has been on the market for some time. Other similar devices, such as the McKay Dymek DA-100 ($145) and the Datong Active Antenna, depend upon amplification for signal strength. I have written to England for more information on the Datong device and will report in an upcoming Bulletin.

Evaluation of Datong AD-170 Active Broadband Antenna by Roger P. Limbert, Technical Director of DSWCI. The antenna is a 3 meter long dipole with a differential amplifier separating the two sections. The wideband amplifier does not require tuning nor adjustment permitting the antenna to be located in an attic or loft. It is not designed for outdoor installation. The 50 ohm output of the amplifier is fed by coax to the receiver.

Power required is 12 VDC (80 MA) and can be drawn from the receiver or from a Datong accessory MPU power supply. (Specify 115 VAC 60 Hz).

The AD-170 covers 60 kHz to 70 MHz and has flat frequency response minimizing receiver intermodulation. Antenna is practically omnidirectional to high angle sky waves (DX) but is directional to low angle sky waves (local interference). Full instructions and technical data available for SASE (from the Club).

Remarks by Roger Limbert: 1. Although the dipole legs are quite short (1.5 metres each) directional properties are evident relative to local interference, even down to 60 MHz. 2. This directionality is very useful in nulling out drn sources such as TV line timebase hash, etc. 3. Actual signal strength is usually less than a long wire, but given a modern sensitive receiver with a good noise figure, this is not important. Provided the antenna's sensitivity is such that the noise picked up by the antenna masks the noise generated by the receiver, no further improvement in reception will occur by increasing the sensitivity with a longer antenna. 4. I was surprised to find the AD-170 inferior to my Joy Stick on 60 metres. Later models have a preamp fitted which gives added gain equal to doubling the length of the dipole. However, this decreases the nulling ability for drn. Vertical, or near vertical mounting is recommended by the manufacturer, but again the directional rejection of local QRM is sacrificed. 6. Cross modulation and images are not a problem with the Datong. All in all, I am very much impressed with the AD-170. A similar antenna (the RAK Listener) has too much gain for my liking and can produce cross modulation. (Note that the U.S. agent for RAK Listener warns it is too "hot" when located close to any type of transmitter.)

The Datong Active Antenna does not require an antenna tuner nor a preselector. Factory advises 12-1-78 new Model AD-170/IB5 incorporates additional amplification of 12dB available with in or out switch. AD170/IB5 lists for approximately $60 plus postage. Order through SDDXC.

Satisfactory Outdoor Variable Frequency Vertical Antenna that does not require a ground plane, for use in locations where a horizontal antenna is not practical. Submitted by Cec Taylor of Lancashire, England and reported in the RBSWC DX News (Budapest). On a 1 inch OD wooden pole, or PVC tube, wrap 30 feet of enameled (or insulated) copper wire as follows: 30 turns at the top, fasten, run wire to 30 more turns 3 feet down, fasten, extend wire another 3 feet below where a third 30 turn coil is wound. Fasten and solder a clip or connector for the lead-in. A good method to anchor the 3 coils in place is to drill holes just large enough to insert wire at both ends of each coil. Solder a copper disc or radiating 6 inch wires to the top of the upper coil. Give the pole/tube and coils several coats of clear lacquer or varnish. Mount vertically as high as possible in a location allowing the shortest insulated wire lead-in (not coax) to the receiver. This antenna must be used with an antenna tuner or preselector.

Active Antennas: In the DXWCI Bulletin of November, Gilfer Associates is credited with comments on Active Antennas, using RAK Listener 7 and the Datong AD-170 as examples. The crux of the comments is that no active antenna can be expected to outperform a standard long wire of 50 to 60 feet. Active antennas are used by the military where an outside antenna is impractical and are ideal for SWLers with restricted antenna space, or those that must use indoor arrangements. High gain amplifiers such as used in the Listener 7 can be a problem in metropolitan areas where many AM, TV & FM broadcasters are located. The Datong has a smaller gain.

Radio West Specialty Antennas: It is a pleasure to find a competent engineer developing antennas for special functions in the field of SWL. I should have written "engineers" as I am sure both Grant Manning and John Kolb are responsible for the present array of "picker-uppers" now available. Radio West's new catalog (due very soon) lists the following:

1. The "Shotgun" Ferrite rod loop antenna for MW coverage only. Directional and tiltable and developed especially for use with the Radio Shack TRF BCB receiver or similar types. With a Radio West modification of 2 ceramic transfilters added to the TRF and the "Shotgun," a hard-to-beat package is offered by Radio West for $74.95. The antenna alone is sold for $35.00. For indoor use only.
2. The Sanserino Loop antenna is sold only in kit form if ordered by mail. It is a large air core loop for directionable tuning or nulling interference which covers only the MW band. It is also for indoor use and sells for $85.00. Having an FET amplifier built into the loop base enables the professional loop to outperform most outside antennas, in addition to the control advantage of its directionality.
3. A Special Ferrite Rod loop antenna for coverage of LW, MW and the Tropical Band comes equipped with a directional and tiltable 22½ inch highly sensitive unit with a controllable Preamplifier. It comes equipped with 3 interchangeable coils: 150-540 kHz, 54-1600 kHz and 1600-5000 kHz. Does not tune above 5000 kHz (only the tropical SW bands). Being a tuned unit, it outperforms a broadband type of active antenna. It sells for $142 complete.
4. The KRS Active Antenna consists of a whip antenna with an amplifier module at its base. This should be mounted free from metal objects and as high as possible (if outside) or in a selected location (after careful experimentation) if restricted to indoors. Mounted to a balcony railing can be effective. This antenna is connected to your receiver through a control unit beside it. A 50 foot coax cable is supplied. This unit has a variable control over the amplification and feeds current to the whip module. This is an all-band antenna and covers

from 200 kHz LW through MW and includes SW to 50 MHz. It sells for $115.00 complete.

5. Lastly, Radio West offers their KS Preselector, a unit that amplifies and improves the signal as received by any antenna. It adds oomph to any receiver and I even use mine to improve the reception of my Drake R-7/DR-7. A KS Preselector and a 108 inch CB whip antenna makes a very acceptable active antenna for indoor use or as a portable antenna for traveling with your SW receiver. I consider my KS Preselector and my Autek QF-1A Audio Filter as being essential adjuncts to my main tuning devices. The KS Preselector sells for only $90.00. It covers 2 to 30 MHz in two bands and the on/off switch cuts the unit out of the antenna circuit leaving it direct.

Refer to Page 1 of Bulletin No. 22 for a report on the KRS Active Antenna by Sandy Blaize, a technical editor for SPEEDX. Sandy put the KRS unit to an unfair trial as the whip was installed only 8 feet off the ground between two buildings (frame bungalows, but still a blockage to free reception of incoming signals). Even with this handicap, Sandy reported superior reception to his 125 foot longwire and super results on the 90 and 120 meter bands. His criticism of overloading and cross modulation on the MW band was a bit overdone. Any modern, sensitive receiver (even my Drake R-7) will overload and cross modulate if you feed it from an efficient antenna. Attenuation is the only answer to the problem.

A recent letter from SDDXC member Paul Kowalski of Milwaukee praises both the "Shotgun" loop and the Special Ferrite Rod Loop. His RF-2200 with the Shotgun outperformed a friend's larger receiver with a 130 foot longwire. His ability to use the directionality of the Shotgun for controlling interference gave him a better and cleaner signal. A receiver with a built-in ferrite rod AM antenna can be improved tremendously by placing the Shotgun loop parallel without a physical connection.

The Special Ferrite Rod Loop proved invaluable in eliminating city interference on the Tropical Bands. Stations here-to-fore impossible to hear distinctly can be unshackled from local QRM by directional nulling. Paul terms the results miraculous. On the MW band, the antenna is even more spectacular, outperforming anything possible without its use. He is now able to pick up South American MW stations satisfacorily which previously had been only buried carriers. Paul warns that the unit is not designed to be used with a receiver with a built-in antenna. However, the Shotgun can be used in connection with a receiver antenna, setting the receiver antenna to the station peak and the Shotgun to null the interference with only the Shotgun close to the receiver, not connected. Paul's report is 11 pages and I'll send a Xerox for $1.50 and a large SASE. For more details write to Radio West for a catalog. 3417 Purer Road, Escondido, CA 92025.

Commercially Available Antennas (From "The Marketplace" of the ANARC Newsletter of August 1980):

1 - Antenna Supermarket Box 563 Palatine, IL 60067	Tuned Trap Dipole 13-49 meters 45'10" long w/100' coax lead-in. Price: $55.00
2 - Datong Electronics Spence Mills, Mill Ln. Bramley, Leads LS13 3HE, ENGLAND	Indoor 3 meter long dipole with amplifier. 60 kHz-70 MHz Price: £ 33.00 (pounds)
3 - McKay Dymek Company Box 5000 Claremont, CA 91711	DA-5 MW Antenna shielded ferrite loop, tuned preamp. 115 VAC. Price: $185.00 DA-7 MW & LW same as above $200 DA-100 Indoor-Outdoor 4' whip with preamp unit 50' coax to control box & power supply 50 kHz-30 MHz. Price: $135 DA-100M Marine type with glass whip & corrosive resistant hardware. Price: $165.00
4 - MFJ Enterprises, Inc. P.O. Box 494 Mississippi State, MS 39762	21" whip mounted on preselector. Outdoor antenna can replace whip. 300 kHz to 30 MHz. 9 VDC cell. Price: $80.00
5 - Palomar Engineers Box 455 Escondido, CA 92025	Base amplifier with plug-in directional loops of 1600-5000 kHz (MW) & 150-550 kHz and 40-150 kHz (LW). Amp: $67.50 Loops: $47.00
6 - Partridge Electronics 4 Partridge House Prospect Rd., Broadstairs, Kent CT 10 1LD ENGLAND	7'6" whip with Joymatch tuner. Indoors or out. Passive. Price: Approximately £ 50 (pounds)

7 - Radio West 3417 Purer Rd., Excondido, CA 92025	Ferrite Loop rotatable mtd. on high-gain FET Amp. 3 coils: 150-540 kHz LW, 540-1700 kHz MW & 1700-5000 kHz SW. 9VAC. $145 Complete Sanserino Loop Kit air-core box loop for MW with FET Amp. Directional. Price: $85.00 "Shotgun" Loop passive ferrite rod inductance-couples to Rx loopstick. Price: $35 KRS All-band Active Antenna 3' whip, FET Amp to control box. AC or DC. Price: $115 Eavesdropper Trapped Dipole covers 11 to 60 meters, 43' long w/100' lead-in & 50' halyard. $60.00 UPS ppd.
8 - Edmund Scientific 101 E Glouchester Pike Barrington, NJ 08007	Select-A-Tenna vertical encased loop MW w/FET Amp. Directional. Price: $32.50 Deluxe AM Antenna ferrite rod loop MW passive w/FET Amp. Price: $229.50
9 - Teletron Corporation Box 84, Suite 100 Kings Park, NY 11754	"Slinky" extendable helical antenna. All-band. Specify for SWL. Price: $39.95

Active Antenna Comparison:

1. Radio West KRS All Band Active Antenna with whip extended to 3 feet vertical at 30 foot elevation with a 24 foot coax lead-in. (Inferior location to DA-100.)
2. McKay Dymek DA-100 Active Antenna with whip horizontal at 30 feet elevation with 42 foot coax lead-in.
3. Fifty foot inverted "L" (Long Wire) at 35 foot elevation with semi-vertical coax lead-in of 45'.

A. Drake R-7/DR-7 receiver with AGC control at Medium and PreAmp engaged. Actual audio strength did not vary as much as indicated by the "S" meter.

B. Tests not attempted where noise level approached the signal strength (i.e., Tropical Bands). The sign "N" indicates excessive noise in comparison with other antennas.

C. Signal strength marked with a minus sign (-) indicates "S" units under 9 and with a plus sign (+) decibel units over 9.

Frequency	GMT	KRS	DA-100	50'LW	KS-PS
21460	0003	-7	-8	-3.5	-8
21570	0006	-5	-6	-3	-7
21560	0009	-7	-8	-4	-9
21710	0012	-7	-8	-5	+5
21740	0016	-8	-9	-7	+10
25930	0018	-3N	-4N	0	-5
26020	0024	-3N	-4N	-.5	-3
17640	2357	-7	-6	-3	-7
17780	2342	+20	+15	+10	+25
17805	2345	+20	+15	+5	+20
17865	2237	-8	+10	-7	+5
17870	2240	+10	+20	+5	+15
17880	2353	-3	-9	-6	+5
19261.5	1944	-7	-7	-4	-9
15000	0028	+10	+5	+10	+20
15050	0032	-8	-5	0	-7
15105	0037	+15	+10	+5	+20
15215	0040	+20	+15	+10	+25
15240	0042	+15	+10	-9	+20
15260	0044	+15	+10	+10	+25
15305	0046	-9	-7	-8	+10
15390	0048	+20	+15	+10	+25
15430	0051	+25	+20	+20	+35
15445	0054	+15	+10	-9	+20
11680	0057	-7	+10	-7	-9
11710	0100	-8	+10	-7	-9
11740	0103	+20	+25	+15	+20
11765	0108	+10	+15	-9	+10
11820	0111	-9	+10	-9	+10
11855	0116	-9	+15	-9	+10
9525	0423	+20	+40	+15	+30
9545	0425	+30	+50	+25	+40
9575	0428	+20	+35	+15	+25
9615	0430	+20	+35	+20	+35
9660	0432	+10	+25	+10	+20

Frequency	GMT	KRS	DA-100	50'LW	KS-PS
9715	0436	+20	+40	+25	+40
9745	0438	+20	+40	+30	+40
9760	0439	-7	+10	-7	+5
7105	0443	-9	+15	+10	+25
7155	0445	-7	+5	-6	+10
7270	0450	+10	+15	+10	+30
4770	0514	-9	+10	-8	+15
5970	0453	-9	+10	-9	+20
5995	0455	+5	+15	+10	+30
6035	0459	+10	+15	+10	+30
6060	0503	+10	+15	-20	+40
6125	0506	+5	+15	+10	+35
6165	0508	+20	+25	+20	+45
6175	0511	+20	+30	+25	+50

Remarks: Difference in height of the KRS and DA-100 probably affects the different readings considerably, so comparison should take this into consideration. Overall, the KRS unit was quieter than the DA-100 by a small margin.

KRS All Band Active Antenna: 3 foot telescope whip with FET Preamp module for roof mount. Supplied with 50' coax lead-in to amplifier and power source at the receiver. Complete and freight paid $115.00, Radio West, 2015 South Escondido Blvd.,Escondido, CA 92025 714/741-2891.

DA-100 All Wave Active Antenna: 4 foot 7 inch whip with Preamp module for roof mount supplied with 50' coax lead-in to amplifier and power source close to receiver. Price is $135.00 ($165.00 for Marine model). McKay Dymek Company, 111 S. College Ave., Claremont, CA 91711. Telephone: 800/472-1783.

KS Preselector ($90.00) being replaced with a "new and improved" model due to be hatched soon. Watch for announcement.

Active Antenna Comparison: Refer to Page 28, Bulletin 26 for my comparison between the Radio West KRS All Band Active Antenna and the Dymek DA-100. The comparison showed the Dymek unit to be slightly superior on some bands. However, at the end of the chart I suggested consideration should be given to the fact that the KRS antenna was at a disadvantage, due to its inferior height and (not mentioned) a hasty installation. Since then I have reinstalled the KRS at an equal height and substituted coax for the temporary lead-in from my wall switch to the receiver. The KRS no longer lags behind the Dymek on any frequency and *it is quieter*. Someday I'll learn to take my time and be more careful.

Medium Wave Front End Booster: The Select-A-Tenna is the subject of a report by SDDXC member Paul Kowalski of Milwaukee. This device is similar in performance to the Radio West "Shotgun" Loop Antenna. They both can be used as indoor antennae or to permit an outside antenna to be used with any receiver with a built-in ferrite rod antenna. Both devices must be placed close to the receiver, allowing an inductive coupling between both antennae. Both are directional and can either tune in a signal or tune out interference. With receivers with a top-side gyro antenna, the set antenna can peak the wanted signal and the device antenna can null the interference. Both are passive devices and do not require current to obtain a substantial RF gain.

The Select-A-Tenna is bulky, measuring 11' x 2" and must be placed up-right and perpendicular to the receiver's built-in loop. The "Shotgun" should be parallel and is much smaller, being about a foot long with an attached tuning device. The Select-A-Tuner seems to have a stronger field as it will function up to about 8" from the set, although the gain is no greater. This is a factor when using with the RF-2900 which seems to have its antenna too far "inside" to make good contact (inductively) with the "Shotgun." Some users tape the "Shotgun" to the gyro antenna on equipped receivers. However, this interfers with the peak-null advantage explained previously.

The Select-A-Tenna sells for about $32.50 including postage. It is sold by Edmund Scientific Co., 101 E. Glouchester Place, Barrington, NJ 08007. Radio West's "Shotgun" is $35, postpaid.

The bottom line is: Both being equally effective and the same price, it is a choice between bulk and compactness and coupling distance. An RF-2900 owner may opt for the Select-A-Tenna, while those having 2200, 2600, 5900W, etc. would prefer the "Shotgun." If Grant Manning gives me other reasons, I'll let you know.

Radio West KRS All-Band Active Antenna explored with other Radio West products in last month's bulletin has been subjected to the knowledgeable scrutiny of Mike Hardester, an experienced and dedicated hobbyist. Mike is a member of the SDDXC (naturally) and has just returned to San Diego after a Navy hitch on Okinawa.

His careful test and examination of the KRS unit revealed a performance almost identical to my test of the Dymek DA-100 Active Antenna which I reported in Bulletin 9. Mike used an FRG-7/RWM, an FRG-7000 and a Kenwood R-100/RWM, a KS Preselector and a 200 foot longwire for comparison. He tested on LW, MW, SW and Tropical Band SW. As with my Dymek DR-55, a Drake SPR-4 and an RF-2900, my KS Preselector and a 50 foot longwire, the active antenna outperformed the longwire but not the longwire with the Preselector. In my test, the active antenna was noisier, but at the factory's suggestion, I raised the antenna and swung the whip to a horizontal position. This improved the noise-to-signal ratio tremendously. I plan to explore this horizontal idea with Grant's KRS unit when it arrives and will report. The "RWM" used above refers to "Radio West Modified."

Active Antennas: It is reported in the December DSWCI Bulletin that member Michael Peters of Winnepeg, having had problems with longwire antennas, now has all three of the better known active antennas: a McKay Dymek DA-100, an RAK Listener 7 and a Datong AD-170. He likes the Dymek DA-100 best, and reports that the Listener 7 produces spurious signals. Mike works an R4B and an FRG-7.

Apartment Dwellers with antenna problems, try clipping the antenna wire to the finger stop of your dial telephone.

VHF/UHF All Band Monitor Antenna: As mentioned in a previous Bulletin, the most satisfactory system for optimum reception of the three VHF/UHF bands is three separate antennas, one for each band. Many hobbyists sacrifice some sensitivity for the convenience of an all band antenna. I first tried the Radio Shack Archer trident antenna but found it did very little to improve the small whip supplied with my Bearcat 300. Learning that this unit was not thought much of, I purchased an Avanti Aero Scan Model AV-801. This was a decided improvement and brought in signals not available with the receiver's whip nor the Archer unit. Hearing of my experience, Bob Grove of Grove Enterprises (Route 1, Box 156-13, Brasstown, NC 28902) sent me one of his Scanner Beam directional antennas. This is a log periodic dipole array similar to the antennas used by the military. It is 44 inches long and being all -aluminum, very light. It covers 30 to 512 MHz with the upper two bands (108-174 & 421-512) quite directional. This antenna can also be used for transmitting on the 144, 220 and 420 MHz Ham Bands.

To give the antenna a fair trial, I extended my TV mast another ten feet upwards and installed the Scanner Beam with a Channel Master Rotor (leaving the TV antenna 10 feet below). I connected the lead-ins from both the Avanti and theBeam to a DPDT switch just 18 inches from the receiver.

Connecting the Avanti, I scanned each band for signals that disappeared when the antenna switch was opened. (All local signals played strongly with only the 18 inch lead.) I then switched to the Scanner Beam and worked the rotor for best reception.

I discovered a number of things: 1st, the Scanner Beam properly aimed with the rotor gave me not only approximately 10dB gain over the Avanti, but also a quieter signal. 2nd, the Channel Master was too slow and mechanically noisy, so much so as to make it difficult to locate the most sensitive direction. 3rd, the gain was very much worth while in bringing in a weak signal. 4th, the directional properties, especially on the UHF, made it possible to separate two signals on the same frequency if coming from different directions.

The slow moving and noisy rotor presented the only bad feature. My opinion, after a short test, is that a directional antenna is best used when the direction of your wanted signal is known. Searching willy-nilly for VHF/UHF DX is best done with a non-directional antenna which does not require "tuning," especially with a slow moving rotor.

VHF/UHF Receiving Antennas: The most satisfactory antenna for VHF/UHF tuning is a tuned antenna for each band. This requires at least three units, all mounted as high as possible and with individual coax lead-ins. A splitter or gang switch is then required close to the receiver to select the proper antenna. A more convenient method, but less efficient system, is the single antenna tuned in some manner to cover all the VHF/UHF frequencies. This also requires a high mount for good sensitivity and reduction in ground hugging QRM. Some hobbyists take advantage of their present tall TV mast to support their VHF/UHF general coverage antenna. However, care must be taken to lower the TV antenna to give adequate separation to avoid intercoupling in any way. The following is a listing of a number of manufactured VHF/UHF antennas on the market:

> Communications Electronics Special All-Band Base Antenna #A70. Covers VHF Low, VHF High and UHF 30-512 MHz. $25.00
>
> Bearcat Tri-Band Base Antenna covers 25-512 MHz and costs $31.95.
>
> Radio Shack #20-014 All Band Base Antenna $29.95.
>
> Antenna Specialities Co. Professional-type Scanning Receiver Base Station Antennas: Model Mon-8 Whip with loading coil and stainless steel radials covers 25-50 & 130-174 MHz for $32.95.
> Model Mon-3 Vertical with S.S. radials covers 130-174 and 450-512 MHz for $16.95.
> Model Mon-R31 Whip with loading coil and S.S. radials all-band covers 25-50, 130-174 and 450-512 MHz for $34.95.
> Model Mon-26 Dual Band Pre-Amplifier covers 30-50 and 150-174 MHz.

Individual band antennas are stocked by most dealers and range in price from several hundred dollars to about $20. A coming Bulletin will discuss home-brewed VHF/UHF antennas.

Dymek DA-100 Active Antenna: In the January Bulletin, I reported a comparison of the Dymek antenna and my 50 foot longwire at 40 feet, with and without a KS Preselector. I found an inferior noise-to-signal ratio on the Dymek on the 11 and 15 MHz bands. At the factory's suggestion, I swung the rooftop whip to a horizontal position, as most man-made static has a vertical polarization. To my surprise, it worked. The Dymek is now the same as the longwire as to noise/signal ratio on all bands.

I have two almost identical antennas, both 50 feet long. One is supported by two masts 40 feet above the ground, and the other between a higher palm tree and a shorter mast. Both have insulated wire lead-ins. Because of my new intelligence (?) about vertically polarized QRM, I changed the lead-in on one to shield-grounded coax cable. I seem to have lost a couple of decibels and only gained a very slight noise advantage. I wouldn't know it was there if I didn't know it should be.

Audio Filters: An article by Syd Osterman in the March RIB suggests that an audio filter can be used to greater effect if one first tapes the signal and then plays back the tape through the filter. This method avoids the possibility of losing the ID while you are adjusting the filter. After the signal is on tape, you can play it back as many times as you wish, and through all combinations and modes of the filter until you have successfully extracted your ID. This certainly does enable one to calmly explore the capabilities of the filter. I have found it to be so practical that I have disconnected my Autek QF-1A filter from my receiver and now have it plugged into the output of my cassette recorder. I now do my filtering of a taped signal without the urgency of a live and fleeting image.

Autek QF-1A Audio Filter: The purpose of an audio filter is not to improve a signal to make it more pleasant, but to make it more understandable or readable. This is done by selection or rejection of audio frequencies, selecting the desired portion of the signal and rejecting the unwanted portion. This generally consists of an attempt to extract a voice frequency from unwanted interference, atmospheric, man-made or signal slop. The success of this performance depends upon the individual signal being received. If both voice and interference share the same frequency, nothing much can be done.

Audio filters have been with us for some time, mostly in the form of "fixed" filters where certain frequencies are controlled or limited by such devices as Low Pass, High Pass, Notch or Peak. The Low Pass passes low frequencies below a fixed cut-off point; the High Pass does the same for the high frequencies; the Notch rejects a narrow band of frequencies; and the Peak selects a narrow band. Unless a receiver is plagued with only one recurring problem that responds to one method of filtering, the operator is faced with the need of several filters.

Autek Research originated and was the most successful in the development of the incorporation of several filers into one device and, best of all, to make these several filtering devices variable. A choice of filters controllable as to selectivity and frequency gives you the ideal tool for the job of audio filtering.

Autek's popular QF-1 Audio Filter has become indispensible to thousands of hams, but only a few SWL have discovered its possibilities. This was due to the fact that the device was designed primarily, and marketed, to meet the requirements of the amateur, and its usefulness in shortwave listening was incidental.

The new QF-1A Audio Filter changes this picture considerably. Improved versatility and added functions now make it equally valuable to both amateur and SWLs.

As this article is directed to the SWL and DXer, I will omit reference to CW, SSB, RTTY, SSTV, etc. Four controls and a switch are supplied. The switch disconnects the device and shunts the audio directly to the speaker/'phone. The first control is marked AUX NOTCH which covers 80-11000 Hz, and is always active. It functions as a broad notch to reject hiss and high frequency atmospherics and can also be tuned to reject heterodyne whistles or CW QRM. Unless used for rejection, a 9 o'clock position is recommended on voice reception. Control #2 is the mode switch which can be set to PEAK, NOTCH, LOW PASS and HIGH PASS. The third control is SELECTIVITY for all modes. This controls the width or skirt of the NOTCH or PEAK. The final control is the FREQUENCY, 250-2500 Hz for all settings.

You have the ability to first narrow the signal to eliminate high frequency hiss and much of the unwanted spectrum, or to reject a specific interference. To then choose the mode of filtering depends largely upon the type of interference present. Next, to control the width or skirt of the chosen mode and, finally, to adjust the frequency to where the voice predominates and the interferences is the least objectionable.

The factory supplies instructions which help you to bypass a lot of experimentation. Different kinds of signals are dealt with separately, as are various types of interference.

In these days of crowded bands, even the most sophisticated receiver, with its various selectivity settings, needs additional help to clean up a signal for a good ID. Interference which is blanketing the voice ID can be, in most cases, either eliminated or reduced with an audio filter. Because of the lack of such a filter, I remember days of returning to a signal before conditions permitted a positive ID.

The Autek QF-1A is not a miracle worker, but a useful tool for the serious DXer. It sells for $65 ppd. It is self-contained and plugs into the line between your receiver and the speaker and requires only your 115 VAC 60 Hz. Autek Research, Box 302E, Odessa, FL 33556

Kantronics Dual Audio Filter: Oddly named "Signal Enforcer" has appeared on the SW gadget market for $189.95. They must think we have money left over after buying that new rig. It is called "dual" as it is designed to peak one signal and null an interfering signal. Both filter channels can also be used to double-peak or double null. Other than the dual channel feature, the device is similar to the Autek QF-1A, being inserted between the receiver and the speaker (or between two tape recorders) and controls the quality and selectivity of the audio, not RF or IF. I have found my Autek filter to be most effective when used to improve and make intelligible a signal which has been taped. To attempt to improve an audio signal being received can lose you the sought-for ID. A really messed-up signal which you have put on tape can be manipulated and made "readable" with an audio filter installed between two cassette recorders. You can play the signal over and over while you explore the filter's capabilities. Many times you can "clean up" a signal so that it can be recorded for your master tape library.

Bearcat 300 VHF/UHF Monitor-Scanner: Here is the promised evaluation of the new Bearcat 300. Although my testing has been rather short, I think I can give you a good picture of this very fine apparatus. I would be very appreciative if a reader would advise me if any errors have been committed in this rather hasty evaluation. I can then correct myself before this becomes a historical document.

The Bearcat 300 Scanner is a compact 12" x 4" x 7" WHD 6 lb. package of electronic wizardry that makes exploration of the VHF/UHF bands a pleasant task. This scanner-computer offers three methods of tuning: 1st, the "Scan" function which makes it possible for the hobbyist to "Scan" frequencies which he/she has stored in a memory bank of 50 channels (refers to a segment of the memory bank occupied by only one frequency).

The "Search" function permits the scanning of 2,100 frequencies in 6 bands which have been pre-programmed by the factory. Any of these frequencies may be entered into the memory bank, as can a frequency set up on the keyboard numbered buttons for future recovery by scanning.

The third function is known as the "Service Search." The factory has programmed frequencies assigned to various public services in all bands and has made them available with buttons marked accordingly.

Active VHF-UHF frequencies have been allotted to users in steps which vary according to the frequency range. MW broadcast frequencies are separated by 10 kHz (may change soon to 9 kHz), SW frequencies by 5 kHz (with deviation in USSR, China, etc.) The gap, or step, in the VHF/UHF spectrum varies from 20 to 50 kHz, with the larger steps in the UHF. This makes available 2,100 "active" frequencies within the bands of the Bearcat 300. All of these 2,100 frequencies have been pre-programmed into the "Search" function and the "Service Search." You need to identify the active frequencies in your locality and either note them on a log or enter them in your memory bank for future recovery. It should be noted here that frequencies that you have programmed into the 50 channel memory bank can be changed or replaced at any time with a more interesting or active frequency. You need only to re-program the channel. In a short time the memory bank will contain your territory's most active and interesting frequencies.

Coverage of the 300 is in six bands: 32-50 MHz Low Band, 118-136 MHz Aircraft, 144-148 MHz Amateur, 148-174 MHz High Band, 421-470 MHz UHF Band and 470-512 UHF-T Band. A telescoping antenna easily handles normal reception but terminals for an exterior antenna are for the DXer. Sensitivity is rated at 0.4μV for 32-50 and 144-174, 0.8μV for the UHF and 1.0μV for the aircraft frequencies (118-136 MHz). Selectivity, of less importance than in SW tuning, is rated only at -60dB as ±25 kHz. The Search or Scan speed can be set for either 5 or 15 channels (frequencies) per second. Audio output is 2.5 watts at 8 ohms. Audio quality is excellent.

Front panel controls and features are: Volume with on/off, Squelch (automatic and manual). The display panel contains 11 spaces or "windows" in which all functions are indicated in easy-to-read green figures. The windows, in sequence starting with the left side, are P for Priority, Number for Channel, D for Delay, L for Lockout and 6 windows for the frequency. Dots appearing in the windows indicate channel banks in service. This display panel also indicates a programming error or time error and the time in hours, minutes and seconds (12 hours).

The keyboard consists of program keys 0 to 9 and a decimal point, used to insert frequencies into memory or to manually select a frequency or function. The "E" button enters the frequency displayed into the memory bank. The Scanning control buttons consist of 5 channel banks of 10 frequencies each permitting selection of memory bank segments. The "Scan" button engages the Scanning function. The "Speed" button controls Scanning speed. The "Count" button indicates number of times a chosen frequency has been active since the start of the Scan.

The memory bank of 50 channels, which can be Scanned in its entirety or in segments of 10 channels each or multiples thereof or manually one frequency at a time, must be programmed by the owner, one by one, inserting frequencies from the display or directly with program keys. The inserted frequencies remain in memory (even with a power outage) until a new frequency is programmed in that channel.

"Scan" function control buttons are: "Lockout" which locks out chosen channels during Scan, but does not erase. "Delay" holds display for 2 seconds to allow reply on the same frequency. "Priority" samples channel 1 every 2 seconds overriding all functions when signal is encountered. "Time" displays hours, minutes and seconds on frequency readout. "Aux" activates function on rear panel. "Dim" cuts light intensity of display.

The "Scan" function is used to recall frequencies stored by the operator in the 50 memory channels. These are the frequencies of stations in the owner's territory which he wishes to have at finger-tip. These can be in random sequence but may be rearranged in any order convenient for Scanning by re-programming. Certain services can be grouped in the segments of 10 channels each, allowing selected scanning.

Automatic Scan or Service Search is a feature of this receiver. It supplies 11 pre-programmed bands which contain all of the frequencies assigned to a public service. The control buttons are marked: Police, Fire, Marine, Ham, Emergency, Telephone, Government, Forest, Industry, Transport and Aircraft. Engaging any of these buttons will scan all frequencies assigned to that service. The frequencies which are not in service in your territory may be locked out to speed up coverage. If you hear the sirens in the distance, all you need to do is push the "Fire" button for all of the action. The "Search" function has been explained at the beginning of this article. You can search an entire band or a segment programmed by establishing an upper and lower limit. If you advance the channel number with the "Manual" button after each insertion of a frequency into the memory bank, you need only press the "E" button to insert the frequency you have just encountered while "Searching."

Search control buttons are: "Limit" which permits you to select an upper and lower limit to a search within a band. "Search" activates the function. "Lo" selects or de-selects the Low Band for "Service Search." "Hi" does the same for the High Band and "UHF" for the UHF Band. "Hold" stops the search and can be used to advance one frequency at a time. "Resume" continues Service Search function.

The "Time" button displays hours, minutes and seconds. Keyboard controls are used to set or re-set the time. Time can be displayed even with the receiver turned off. The receiver must remain connected to the 115 VAC line at all times. A power outage will not erase the memory but it will stop the clock. If there has been an outage, the time display will include an "E" indicating the time must be re-set.

It is interesting to note that hobbyists have discovered methods of expanding the coverage of certain scanners by the use of natural harmonics. This permits search of "secret and restricted" frequencies. In most cases the signal is weaker but readable. More on this later.

I went to considerable expense purchasing and installing at 30 feet a Radio Shack 3 whip/3 radial VHF/UHF base antenna. After installation, I tested in comparison with the small whip furnished with the receiver. I couldn't detect any added gain with the outside antenna. Maybe

Bearcat	300	250	220	211	210	8 TRK	4-6	2-4 A/C	2-4 H/U	2-4 L/H
Synthesis	X	X	X	X	X					
Crystal						X	X	X	X	X
Stores		X								
Recalls		X								
Channels	50	50	20	18	10	4	6	4	4	4
≠ 30-50					X					
32-50	X	X	X	X						
33-44										X
33-47							X			
33-49						X				
118-136	X		X					X		
144-174	X		X							
146-174		X		X	X					
151-165						X				
152-164							X		X	X
416-512					X					
420-512	X	X	X	X						
450-508									X	
450-512							X			
450-470								X		
Svc Search	X		X							
*Priority	X	X	X							
*Memories	2100	64								
Clock	X	X		X						
% Price	329	259	259	229	199	79	109	99	99	99

* No. of channels % Discounted Price ≠ Bands

Regency	K500	K100	720A	M100	E106	R106	R804
Synthesis	X	X	X	X			
Crystal					X	X	X
Stores	X		X	X			
Recalls							
Channels	40	10	16	10	10	10	8
≠ 30-50	X	X		X	X	X	X
108-136			X				
144-174	X	X		X			
146-174					X	X	X
440-512	X	X		X			
450-512					X	X	X
Svc Search	X						
*Priority	X		X	X	X		
*Memory	500	15750					
Clock	X						
% Price	259	179	229	179	99	85	79

≠ Bands * Channels % Discounted Price

when I find some DX, there will be an advantage. Will report.

So far I am astonished at the tremendous number of stations doing their thing. The big trouble will be identification. Nobody gives an ID, but you can detect the service.

Bearcat BC-250 Tunes Out of Band: CB Magazine reports member Barry of R.C.M.A. has discovered a means of programming outside regular frequencies. Enter search limits 420-421 MHz. Hit STORE key and let run 2 or 3 seconds. Storage will retain a birdie of 420.7 if your 250's IF is 10.85; newer models will differ. Hit RECALL which displays frequency stored. You can now search below 420.7. Enter in the VHF band a frequency such as 155 MHz as a lower search limit. Hit the RECALL again to see 420.7 displayed as the upper limit. Now, hit DOWN search key to search down from 420 in 12.5 kHz steps. Out of band search is not automatic; UP and DOWN keys are manual. SLOW search speed should be used. Open SQUELCH to hold desired frequency since there is no search-hold feature on the Bearcat 250. Now, hit the LOCKOUT button to store your captured frequency in the search memory. It can then be transferred to a normal channel if desired, as follows: select the channel number into which you wish to store it. Then hit the RECALL to show your band frequency. Now turn off and on the set. Presto, the out-of-band frequency is programmed into the BC-250's permanent non-volitile memory and can be scanned or monitored as would any regular frequency.

Monthly Fun Project: Every DXer needs a 24 hour GMT clock, but for some reason they are very expensive. I re-worked a $5.95 flip card digital clock by painting out the cards containing the PM hours, substituting 13 to 00. However, not everyone is as smart as I am. Now Radio Shack lists a 24 hour clock module in catalog #315, Page 101, order number 277-1005, for $19.95. This is a complete clock and requires only a 1½ volt battery. The extra features, such as month, date, day, seconds and alarm require switches, but as most hobbyists are interested only in GMT time, the switches are superfluous The attractive features of this unit are its small size (11/16 x 1-3/16 inches, smaller than an oblong stamp) and mountability on the front panel of your receiver.

Unfortunately, the back of the module requires some modification to produce a flat surface for mounting with adhesive. It can be mounted in two ways: one is to locate an appropriate panel space and drill a small hole for a battery inside the cabinet; or it can be located close to an edge of the panel where battery wires leading to an outboard dry cell will be inconspicuous. Installation on my Drake R-7 was facilitated by a removable side strip on the front panel. With the module placed in the upper right corner, over the Drake nameplate and a slot cut in the strip, the battery wires are practtically invisible as they lead to an outboard dry cell.

All you need for the job is the module, a piece of black inner-tube rubber, a tube of Duro black plastic rubber and a battery holder. First, cut the ears off the module. Cut two pieces of rubber the size of the module. Solder short pieces of solid bare wire to contacts marked MOD, SET, Vss and Vdd so that $\frac{1}{4}$ inch extends below the module when in position. Connect a jumper wire between pad 2 and Vdd to program the 24 hour movement. Solder a twin lead wire (the smallest obtainable) to contacts Vdd and Vss, marking the far end of the wire attached to Vdd, which is the positive battery contact. The length of this wire depends upon battery position. Don't solder these wires to the battery holder, but fasten temporarily for testing. Consulting the instructions, test and set the clock. Touch a wire from MOD to Vdd, then SET to Vdd. This is the same procedure as termed "Press Mod" and "Press and Hold SET" in the instructions.

When you have mastered the setting procedure, and the clock works, you can proceed with the mounting. To obtain a flat surface for mounting you will need to cut one of the rubbers to fit around the small condenser, the other protuberances and the wires. This is a question of cut and fit. You will find that the rubber is not thick enough to do a good job on the condenser. You will need to hollow out the other piece of rubber to fit over this condenser, so you can remove some rubber by holding against an emory wheel, or burn it away with a hot soldering iron. When the two rubbers are prepared, you can assemble the unit with the black rubber cement. I cut two pieces of thin board the same size as the module and placed the module/rubber sandwich between them and in a small clamp. While drying, you can clean the edges with sandpaper. When dry, fasten to the radio panel with more black adhesive, holding in place with rubber bands placed around the receiver. Now, solder the battery leads to the holder and set and start the clock. A real fancy job would be to rob current from the receiver to light the clock display.

GMT 24 Hour Clocks for Under $20.00: If you watch the ads, locate a flip-card digital desk clock for about $6.00. These clocks have two sets of numbers from 1 to 12, AM and PM. If you paint out the PM numbers with flat black, new numbers 13 to 00 can either be hand painted or white rub-on transfers can be used.

Four .367" bright red LED digits, either 12 or 24 hour operation, in kit form with black aluminum case, switches and transformer (115 VAC) complete for $14.95 from JIM-PAK, 1355 Shoreway Rd., Belmont, CA 94002, or your local dealer.

Tiny ½" x 1¼" black module with .25 inch LCD black display by Radio Shack (#277-1005) for $19.95. (Watch for sale for less.) Clip off mounting ears and stick to front panel with black plastic rubber (easily removed) running small wires to outboard 1½ V cell or through minute hole to cabinet interior. With addition of switches for time, adjustment will also show time/day/date, light backlight or sound alarm (extra). Without switches, time can be reset by touching contacts left exposed on lower edge of mod.

GMT 24 Hour Digital Clock: Expensive, but beautiful, a 4½ inch smoke color acrylic cube with ½ inch LED numerals, bright in daylight, dimmer at night: $49.95. Also available in clear or bronze color. Same numerals in an acrylic cylinder with walnut ends: $44.95. Also in kit form with hand finished solid walnut (1½" H x 4" W x 4"D) cabinet with optional functions: $34.95. Catalog also has snazzy automobile digital gizmos, a clock, a tachometer and a miles-per-gallon computer. Write: Digital Concepts, 249 Route 46, Saddle Brook, NJ 07662. Tel.: 201/845-7101.

Up-Converter: On Page 2 of the December Bulletin was dope on a British-made Up-Converter which permits the use of a 2 or 10 meter Ham receiver for reception of SW frequencies. It now appears there is a USA counterpart on the market. See the Clegg advertisement on Page 133 of the same QST (available at most libraries) or write your Club.

Morse-A-Word CW Decoder: What next??? The dits and dahs which have been just so much QRM to most of us can now become part of the fun. In the March Popular Electronics is an article entitled 'The Morse-a-Word" describing a device that transforms Morse code signals received on your radio into printed words that can be read as they come in. On a unit no bigger than a preselector, a device that looks like a digital readout displays alphanumeric multi-character symbols in a moving sequence which can be read as from a ticker tape or teleprinter. The dits and dahs are transformed electronically into letters, numbers, punctuation marks and word spaces which appear in printed form and move from left to right as you read them. There is a control to match the speed of the display to the speed of the incoming code signal, and a switch to defeat the word-space feature (some CW transmissions do not space the words).

What we shall call the print-out is naturally disturbed or downgraded by static, fading or a lousy fist; however, it is claimed that the device will do a very creditable job of decoding under conditions far from ideal.

The article is not clear (to me) how many symbols are displayed on the LED readout in the basic kit. The parts list reads "two dual-character IEE 17854 LED displays (one or two additional displays optional)" but the illustration shows 7 characters and 1 space. As far as I can figure out, a complete (?) kit with 2 two-character displays sells for $150.00. Although the word *complete* is used as to the kit, the Power Supply is listed as $22.00. Additional two-character LED displays are priced at $9.00 each. If my interpretation is correct, a complete kit for the Morse-a-Word illustrated would total $190.00. I am going to send this article to the manufacturer of the kit for confirmation of my "interpretation," and to request a price on a completed ready-to-eat Morse-a-Word for those without kit-building ability or patience.

The article closes with word that Part Two appears in the April P.E. with description of assembly, alignment and use. Kits are available from Microcraft Corp., Box 513, Theinsville, WI 53092. (P.S. For this informative article, I think I should be entitled to a 'Morsamatic" (a better name). All in favor, raise your right hand!!!)

Morse-A-Word by Microcraft: Mine arrived yesterday and I'm having a ball learning how to use it. The MAW (Morse-

A-Word) is a device for reading (decoding) CW signals as they are received on your SW receiver. It merely plugs int the speaker or 'phone jack of your receiver. Switch on the BFO, SSB, USB, LSB or RTTY and search for a CW signal that sounds like the operator knows what he is doing. Switch on the Morse-A-Word. The controls are simple; the front panel has a Speed control, two LEDs (one marked CODE and the other DAH) and the 8 character display. The rear has a switch for the word spacer as some transmissions do not space their words, a jack for the audio input, a jack for a key for code practice and the 110 VAC line.

Set the Speed control to slow, medium or fast according to the signal being received. Now tune your signal carefully until the CODE LED flashes with the dots of the signal and you hear the signal on the MAW's little speaker. Now readjust the Speed control until the DAH LED flashes strongly with the dashes of the signal. If you are lucky enough to have tuned in an operator with a good "fist," the message will march across your display magically. Unfortunately, the MAW only reads what is sent and cannot correct poor keying. If the operator sends two E's too close, you will get an I; an A and a T too close will register as a W, and reversely, a sloppy W may produce an A and N, or an E and M. Another hurdle to overcome is to recognize abbreviations used by both Hams and commercial ops such as YL for young lady, DE for from, HI for a laugh, etc. Many words are abbreviated such as WUD for would, GUD for good, SED for said, etc. It will take some time before you can read the message clearly and to recognize common errors of keying. You can practice on code sent by the ARRL station W1AW on various frequencies. These known speeds can be marked on your Speed dial. The MAW has a very sensitive AGC input of only 1200 Hz so tuning the receiver requires a steady hand. It is best to use broadest bandwidth setting at first. When properly tuned, and the Speed set correctly, letters, numbers and symbols will march across the display from right to left as the signal is decoded. The Morse-A-Word sells for $168.00 in kit form and $250 complete. Mircocraft Corp., P.O. Box 513, Thiensville, WI 53092. They also manufacture the RTTY Reader at $270.00.

Morse-A-Word CW Decoder $250.00: Occasionally one becomes carried away with one's own verbosity and lives to regret it. I refer to my evaluation of the Morse-A-Word in

Bulletin 11. A new device that appears at first to be the answer to the maiden's prayer turns out, after further trial and sober evaluation, to be a turkey, leaving me with my superlatives hanging out. When the Morse-A-Word arrived at the Club, we hooked it up with bated breath expecting to be able to immediately unlock the secrets of the dits and dahs. We tuned in a nice, fat CW signal but all we got was a string of Es, Is and Ts with an occasional legible word. We tried several other signals with the same results. Then we found someone with a nice slow and even fist and low and behold, dits and dahs became words. That was my inspiration for my article in Bulletin 11. From then on our trouble was that we couldn't find that chap again who had the educated fist. That got me worried and I knuckled down to prove or disprove the ability of the Morse-A-Word to decode run-of-the-mill CW. I had blamed our original poor results to inexperience and poor luck in choice of signals. I soon found that we were not at fault, but that the Morse-A-Word was unable to cope with the usual hand-keyed CW traffic. Variation in sending speed and any departure from crisp spacing of dits and dahs defeated the machine's effort to decode CW signals.

I complained to the factory and was told, and I quote, "The Morse-A-Word copies W1AW perfectly as well as other stations which regularly *send CW traffic by computer or keyer* [Italics mine]. Many amateurs and commercial stations use keyers and the resulting copy on the Morse-A-Matic will be excellent. Of course, as mentioned in the article [very gently LB] hand sent code is subject to the vagaries of inattentiveness, boredom and human error on the part of the sender." (End of quote.) The fact that 95% of the CW on the air is sent by that "bored and inattentive sender" was not made plain. It is that 95% that is interesting, not the commercial machine-transmitted traffic.

Now comes the unpleasant part: Because the Club felt that we had been mislead into believing the Morse-A-Word was capable of decoding CW signals on the air, not just a very small portion of those signals, I was instructed to request permission to return the Morse-A-Matic for refund. Contrary to normal procedure, the president of Microcraft, Dr. George Steber, agreed only to "buy back" the "used" MAW for from $140 to $180, depending upon its "condition." A very unfair and arbitrary decision which should give prospective buyers a second thought. We returned the unit and I objected to his adjustment as being unfair. We shall see what happens.

Morse-A-Word CW Decoder: (Refer to Page 11, Bulletin 12) As reported, the Morse-A-Word was returned for refund, but the factory offered only to "buy back" the "used" unit at a very much-reduced price. I can report that, due to my offer to publicize the entire transaction, I received a full refund. It was explained that the Morse-A-Word would only function satisfactorily with a receiver with a passband of at least 1200 Hz and that my receiver must have been "too sharp." A question of too many "Ifs."

DNE Unscrambler: It is not uncommon to encounter scrambled signals on the public service bands. Many agencies object to eavesdropping. The police require a degree of secrecy from criminals; ambulances from the curious; taxis from competition; fish boats from competing boats, etc. and revert to scrambling to thwart the unwanted listener.

The hobbyist is also thwarted in his search for interesting programs. He is not about to divulge information obtained over the air knowing that doing so will subject him to possible arrest.

A device known as the DNE Unscrambler enables the listener to do just that. It connects between the receiver output and the speaker (internal or external) and has a bypass switch so it can remain connected. The device first attenuates the signal, injecting it into a balanced modulated circuit where it is mixed with an oscillator tone. This tuned oscillator is controlled by a front panel knob from below 2800 Hz to 4000 Hz and mixed with the signal, unscrambles and inverts it ready for amplification and feeding to the speaker. Most scrambling is done close to 3500 Hz.

An exhaustive test revealed that all scrambled signals encountered succumbed to the unscrambling process and, although some signals had a Donald Duck sound, they were entirely readable.

Two models are available: D-12 for the base station and P-20 for the handheld portable scanner. Sizes are 3-1/8 x 2-½ x 4 inches WHD and 2-3/4 x 2 x 1-3/16 inches WHD. Operation is from a 9 Volt cell.

Further information and prices are available from Don

Nobles Electronics, Inc., Route 7, Box 610, Hot Springs, AR 71901. Telephone: 501/623-6027.

Kantronics' new "Field Day 2" Morse Decoder: If the reader will hark back to Bulletins 11 and 12, the Club's experience with the Morse-A-Word CW decoder and its return for a refund, he will learn that the MAW readout of Morse signals was on a digital display as advertised but only when the signal was transmitted by computer or machine sender. The average Ham fist produced only gobbledy-gook as his spacing was uneven and the dots and dashes of uneven size. As the machine transmitted copy was the least interesting, the Morse-A-Word was returned as having been misrepresented. We now have a device which claims to copy "sloppy" Morse. It is admitted that hand transmitted Morse is not precise, and its variations present a problem for machine decoding. (This was apparent in the MAW.)

Kantronics claims that their 'Field Day 2," being a computer which has some very basic decision-making abilities similar to the human brain, can copy code that a machine would be unable to decode. The FD-2 even has an advantage over the human brain in that these decisions can be made at 80 words per minute. This decision-making feature is known as "editing." The combination of editing and sophisticated filtering is claimed to overcome the lack of precision of hand keying. Features are Morse decoding 3-80 words per minute (WPM). Programmed to handle sloppy keying. RTTY decoding for 60, 67, 75 and 100 WPM Baudot. ASCII radioteletype ability 110 and 300 WPM baud (300 too fast for reading display except when sent at typewriter speed). Copies any shift of RTTY or ASCII. Has 24 hour digital clock. Automatic code speed tracking. Ten character large-sized display. Accurate Morse code speed computer program. Tuning eye for locking on. Completely self-contained, doesn't require TV set or equipment other than a SW receiver. Runs on 115 VAC 60 Hz. It can be purchased from Radio West for $430. Brochure available.

The next advancement will be a device that reproduces code and RTTY into voice with a switch for the language and, at the same time, prints out the message on your letterhead in full color.

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NYC% - Sold by N.Y.C. Discounters*

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CONTEMPORARY SHORTWAVE RECEIVERS

List Price	Make & Model	Portable	Table Model	Wadley Loop Circuit	PLL Synthesizer	Superhet Conversions	Up Conversion	Pass Band Tuning	Memory Storage Channels	Optional Memory Unit	Cost of Option	Long Wave	Medium Wave	Short Wave	USB/LSB	CW	RTTY	FM Mono	FM Stereo	VHF Public Service	Two Speed Tuner	Fine Tune Vernier	Shaft Encoder Tuning	MHz Rotary Switch	SW Bandspread(s)	Keypad Entry	Scan Tuning	Analog Frq Displa
185	Panasonic RF-2200- - - - - - -	x				2							x	6	1	1		x			x				6			x
265	Panasonic RF-2600- - - - - - -	x				2							x	4	1	1		x			x				4			x
295	Panasonic RF-2900- - - - - - -	x				2							x	3	1	1		x			x				3			x
529	Panasonic RF-4900- - - - - - -		x			2							x	8	1	1		x			x				8			x
3800	Panasonic RF-9000- - - - - - -		x		x	2	x	x	15			x	x	19	2	1	x	x						x	19	x	x	x
330	Sony ICF-2001- - - - - - - - -	x			x	2	x		6			x	x	x	x	x		x					x			x	x	
180	Sony ICF-5900W - - - - - - - -	x				2							x	3	x	x		x			x				3			x
160	Sony ICF-7600 - - - - - - - -	x											x	5	x	x		x							5			x
440	Sony ICF-6700W - - - - - - - -		x			2							x	3	x	x		x							3			x
1895	Sony CRF-320 - - - - - - - - -	x				2						x	x	29	x	x		x							29			x
2195	Sony CRF-330 - - - - - - - - -	x				2						x	x	29	x	x		x							29			x
1695	Sony CRF-1 - - - - - - - - - -		x		x	2	x	x				x	x	x	x	x						x				x	x	x
370	Yaesu FRG-7 - - - - - - - - -		x	x		3							x	3	x	x	x					x			29			x
655	Yaesu FRG-7000 - - - - - - - -		x	x		3							x	29	x	x	x								29			x
559	Yaesu FRG-7700 - - - - - - - -		x		x	2	x	x		12	150	x	x	29	x	x	x							x	29			x
176	Grundig Yacht Boy 100/120 -	x				1						x	x	6				x							6			x
584	Grundig Satellit 1400 - - -	x				2						x	x	6				x			x				6			x
743	Grundig Satellit 2400 - - -	x				2			6			x	x	6					x		x				6			x
1316	Grundig Satellit 3400 - - -	x				2			6			x	x	18	x	x		x							18			x
1095	Grundig RR-1140- - - - - - - -	x				2			8			x	x	3					x		x				8	x		x
700	Drake SPR-4- - - - - - - - - -		x		0	2						x	x	23	x	x								x	19			x
1475	Drake R-7/DR-7 - - - - - - - -		x		x	3	x	x		8	45	x	x	8	x	x	x					x	x	x	7			x
499	Kenwood R-1000 - - - - - - - -		x		x	2	x					x	x	30	x	x								x	30			x
1250	McKay Dymek DR-22C-6 - - - -		X		x	3						x	x	29	x	x	x					x		x				
1750	McKay Dymek DR-33C-6 - - - -		x		x	3						x	x	29	x	x	x					x		x				
1900	McKay Dymek DR-44-6- - - - -		x		x	3						x	x	29	x	x	x					x		x				
1100	McKay Dymek DR-55-6- - - - -		x		x	3						x	x	29	x	x	x					x		x				x
1725	McKay Dymek DR-101-6 - - - -		X		x	3						x	x	29	x	x	x					x		x			x	
1600	JRC NRD-515- - - - - - - - - -		X		x	2	x	x		24	250	x	x	29	x	x	x					x	x	x	29			x
100	Realistic DX-100 - - - - - - -		X			1							x	3	x	x					x	x			x			x
230	Realistic DX-200 - - - - - - -		X			1						x	x	3	x	x									7			x
400	Realistic DX-302 - - - - - - -		X	x		3						x	x	4	x	x									29			X
600	Nordmende Globetrotter 808 -	x				2						x	x	3	x	x		x			x				11			x
280	JVC RC-550 - - - - - - - - -	x				1							x	3				x				x						x
420	JVC RC-M70 - - - - - - - - - -	x				1			16				x	4								x					x	x
170	JVC FR-6600-JW - - - - - - - -	X				2							x	4	x	x		x				x			4			x
380	Zenith Transoceanic 7000 - -	x				2						x	x	7	x	x		x		2	x	x			CB			x
	Magnavox 809 - - - - - - - -	X											x	2				x										x

Torrestronics Universal Digital Frequency Readout: Manufactured by Torrestronics, Inc., 4850 Hollywreath Court, Dayton, OH 45425. Model TK-1 Kit: $89.95 and $2\frac{1}{4}$ x 6 x 6" JW-6 Ten-Tec cabinet: $7.00. Model WTK-1 wired and tested: $135.00 UPS ppd. 1 year warranty.

This is a 4 digit readout (100, 10 & 1 kHz in red and 100 Hz in green). Man, 7 LEDs. MHz is for you to figure out. Sensitivity: 10 mV @ 4.3 MHz to 35 mV at 50 MHz. Range: 500 kHz to 50 MHz. Accuracy: 18 Hz at 14 MHz typical. Maximum DC input: 300 VDC. Power required: 120 VAC at 60 Hz. May be used with any receiver or transceiver. Connects directly without additional wiring to injector output of Drake R4 and T4 Series, Kenwood TS-520 and all Heathkit rigs. Instructions supplied for use with all other receivers.

Can be programmed for use with two receivers or with one receiver with dual IFs (Hammarlund, etc.)

I have used the Readout with several receivers and it is now connected to my Hammarlund HQ-145A which turns that rig from a Ham receiver to a versatile SW rig that is hard to beat. It is ideal for updating older receivers. (Note: Latest info does not mention the kit although it still may be available.)

For the owners of a modified SPR-4 who use, or contemplate the use of an FS-4 Synthesizer: The Synthesizer gives full coverage and is more accurate than the crystal controlled SPR-4 alone, but due to its design, produces images on certain frequencies. Fortunately, these images can be recognized for what they are by their appearance in a reversed position in relation to the AM and SSB settings on a modified SPR-4. A true signal appears 2.5 kHz above the AM frequency when switched to the 2.4 kHz SSB setting. An image produced by the FS-4 appears 2.5 kHz below. If all but one of the crystals are left in the receiver (using the vacant socket for the FS-4 connection) the operator can escape an annoying image by switching from the Synthesizer to the proper crystal band. The factory cautions that when both the crystals and the Synthesizer are used it may be necessary to disconnect the Synthesizer to avoid overload of the receiver's crystal oscillator above 20 MHz. When the Synthesizer is used alone, "the crystal selection switch should

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VHF Public Service	Two Speed Tuner	Fine Tune Vernier	Shaft Encoder Tuning	MHz Rotary Switch	SW Bandspread(s)	Keypad Entry	Scan Tuning	Analog Frq
	x				6			x
	x				4			x
	x				3			x
	x				8			x
				x	19	x	x	x
			x			x	x	
	x				3			x
					5			x
					3			x
					29			x
					29			x
		x				x	x	x
		x			29			x
					29			x
				x	29			x
					6			x
	x				6			x
	x				6			x
					10			x
	x				8	x		x
				x	19			x
		x	x	x	7			x
				x	30			x
		x		x				
		x		x				
		x		x				
		x		x				x
		x		x			x	
		x	x	x	29			x
	x	x			x			x
					7			x
					29			x
	x				11			x
		x						x
		x					x	x
		x			4			x
2	x	x			CB			x
								x

Torrestronics Universal Digital Frequency Readout: Manufactured by Torrestronics, Inc., 4850 Hollywreath Court, Dayton, OH 45425. Model TK-1 Kit: $89.95 and 2¼ x 6 x 6" JW-6 Ten-Tec cabinet: $7.00. Model WTK-1 wired and tested: $135.00 UPS ppd. 1 year warranty.

This is a 4 digit readout (100, 10 & 1 kHz in red and 100 Hz in green). Man, 7 LEDs. MHz is for you to figure out. Sensitivity: 10 mV @ 4.3 MHz to 35 mV at 50 MHz. Range: 500 kHz to 50 MHz. Accuracy: 18 Hz at 14 MHz typical. Maximum DC input: 300 VDC. Power required: 120 VAC at 60 Hz. May be used with any receiver or transceiver. Connects directly without additional wiring to injector output of Drake R4 and T4 Series, Kenwood TS-520 and all Heathkit rigs. Instructions supplied for use with all other receivers.

Can be programmed for use with two receivers or with one receiver with dual IFs (Hammarlund, etc.)

I have used the Readout with several receivers and it is now connected to my Hammarlund HQ-145A which turns that rig from a Ham receiver to a versatile SW rig that is hard to beat. It is ideal for updating older receivers. (Note: Latest info does not mention the kit although it still may be available.)

For the owners of a modified SPR-4 who use, or contemplate the use of an FS-4 Synthesizer: The Synthesizer gives full coverage and is more accurate than the crystal controlled SPR-4 alone, but due to its design, produces images on certain frequencies. Fortunately, these images can be recognized for what they are by their appearance in a reversed position in relation to the AM and SSB settings on a modified SPR-4. A true signal appears 2.5 kHz above the AM frequency when switched to the 2.4 kHz SSB setting. An image produced by the FS-4 appears 2.5 kHz below. If all but one of the crystals are left in the receiver (using the vacant socket for the FS-4 connection) the operator can escape an annoying image by switching from the Synthesizer to the proper crystal band. The factory cautions that when both the crystals and the Synthesizer are used it may be necessary to disconnect the Synthesizer to avoid overload of the receiver's crystal oscillator above 20 MHz. When the Synthesizer is used alone, "the crystal selection switch should

	Digital Frq Display	Antenna Trimmer	Preamplifier	Preselector	Attenuator	Squelch	Tone Control	Noise Blanker	Notch Control	BFO Switch	BFO Pitch	RF Gain	AGC	AFC on FM	LED Tune Indicator	LED Band Indicator	External VFO	Tune & Batt Meter	True "S" Meter	Digital Clock	Time Switch	Xtal Calibrator	Cassette Recorder	Image Rejection	Drift after W/U	Number Speakers	Ferrite Loop	Gyro Loop
oooo							x			x		x		x				x				x		N	N	1		x
oooo	x						x			x	x	x		x				x				x		N	N	1	x	
oooo	x						x			x	x	x		x				x				x		N	N	1	x	
oooo	x	x					x	x		x	x	x		x				x				x		G	G	1	x	
oooo	x									x	x	x	x				x		x	x	x			G	G	1		
oooo	x	x					x			x	x	x						x			x			G	G	1		
oooo					x		x			x		x						x				x		G	G	1	x	
oooo							x									x								N	N	1	x	
oooo	x			x			x			x		x	x	x				x						G	G	1	x	
oooo	x	x					x	x		x		x		x				x		x	x			G	G	1	x	
oooo	x	x					x	x		x		x		x				x		x	x		x	G	G	1	x	
CoRFop	x			x	x			x				x			x			x						G	G	1	x	
oooo				x	x		x	x		x						x		x						G	G	1	x	
oooo	x			x	x		x	x		x						x		x						G	G	1	x	
oooo	x				x	x	x	x		x		x	x					x		x	x			E	E	1	x	
oooo				x				x							x					O	O			N	N	1	x	
oooo	x	x			x	x	x			x		x	x	x				x						G	G	2	x	
oooo	x	x			x	x	x			x		x	x	x				x						G	G	4	x	
oooo	x	x		x			x	x				x	x	x				x		x	x			E	E	2	x	
oooo	x					x	x					x		x				x		x	x		x	G	G	4	x	
oooo										x		x	x						x					G	G	1		
oooo				x				O	x													C		G	G			
oooo	x		x		x		x	x	x	x		x	x				x		x	x	x			E	E	1		
oooo	x				x					x	x	x	x					x		x	x			G	G	1		
oooo	x							x		x						x			x					G	G			
oooo	x							x		x						x			x					G	G			
oooo	x							x		x						x			x					G	G			
oooo								x		x						x			x					G	G			
oooo	x							x		x			x						x					G	G			
oooo	x	x			x			x		x	x	x	x				x		x					E	E			
oooo								x			x	x						x						F	G	1	x	
oooo		x						x		x	x	x	x			x		x				x		F	G	1	x	
oooo	x			x	x			x		x	x	x				x		x						F	G	1	x	
oooo		x				x	x			x	x			x				x						N	N	1	x	
oooo							x							x				x					x	N	N	3	x	
oooo							x							x				x					x	N	N	4	x	
oooo							x			x	x	x		x				x				x		N	N	1	x	
oooo						x	x	x				x		x				x						N	N	1	x	
oooo																								N	N	1	x	
oooo																												

be kept in the socket position that the FS-4 is connected to."

Evaluation of the Drake R-7/DR-7: I have never made a pretense of being a technician nor an expert, and I suspect that some readers may challenge my ability to make a serious evaluation such as this. They have a point, however. The majority of my readers wouldn't know what I was talking about if I should suddenly burst into technical jargon, and it is a fact that actual results are more important than how those results were obtained. So, with the assistance of some technical friends (and some "borrowing from those that are more knowledgeable) I will attempt to evaluate, from a critical listener's viewpoint, the performance of the Drake R-7/DR-7 Communications Receiver.

First, let me explain that this receiver comes in two models. The R-7 does not have the digital readout, nor does it cover the entire spectrum without gaps being designed primarily as a Ham receiver. The addition of the DR-7 section converts the R-7 into a full coverage, no-gap communications receiver with a digital readout. I rather expect that Drake will discontinue the R-7 in favor of the more desirable R-7/DR-7 combination.

In July of this year, Drake loaned an R-7/DR-7 to Chuck Hutton for test and evaluation. Chuck made his tests using good receivers such as the R-390A, SPR-4, FRG-7/3 kHz mod., HQ-129X and HQ-180A for comparison. He made his report and it was also published in the National Radio Club (MWDXers) "DX NEWS." As Chuck Hutton is a recognized "expert," I will "borrow" from his report in the DX NEWS technical information to make my evaluation more complete. I will edit only portions of his work pertaining to MW DXing aimed at NRC members. I will also *Italicize* succinct phrases and interject my own remarks in brackets.

From Chuck Hutton's review: "Some design features are very interesting so I will trace the signal path through the receiver in order to discuss them:

1. In the RF Stage, no amplification takes place unless the 10dB gain push-button controlled Preamp is activated. As can be seen from the specifications [See Bulletin 16] the sensitivity is very good even without the Preamp. It is likely this Preamp will only

Sensitivity LW & MW	Sensitivity SW AM	Sensitivity SSB & CW	Selectivity LW & MW	Selectivity SW AM	Selectivity SSB & CW	Select. Bandwidths	Selectivity Options	Mod Recommended	DRO Recommended	Handle or Strap	Whip Antenna	Power 115 VAC 60 Hz	Power 115/220 VAC	Power 12-18 VDC	Dry Cell Batts	Audio Output	Dimensions Inches	Weight lbs.	NYC %
G	G	G	G	G	G	2		S		x	x	x			x	N	7.5 x 12.5 x 4	7.5	x
G	G	G	G	G	G	2		S		x	x	x			x	N	9.4 x 13.5 x 5	7.2	x
G	G	G	G	G	G	2		S		x	x	x			x	N	9.8 x 15 x 4.7	8.5	x
G	G	G	G	G	G	2		S				x		x	x	N	9.7 x 19 x 14	18	x
E	E	E	E	E	E	3						x	x	x	x	7	14 x 20.5 x 8	45	x
G	G	F	G	G	G	1					x	x		x	x	N	6.8 x 12 x 2.3	4	x
G	G	G	G	G	G	2		S		x	x	x		x	x	N	9.2 x 8.7 x 4	4.4	x
G	G	F	G	G	G	3					x	x		x	x	N	4.7 x 7 x 1.2	1.3	x
G	G	G	G	G	G	2		S			x	x		x	x	N	7.2 x 17.8 x 9	12	x
G	G	G	G	G	G	2				x	x	x	x	x	x	N	12.2 x 17.8 x 8	29	x
G	G	G	G	G	G	2				x	x	x	x	x	x	N	13.5 x 17.8 x 8	34	x
E	E	E	E	E	E	3				x	x	x	x	x	x	N	4 x 10.3 x 13	15	x CRF-
G	G	G	G	G	G	1		S	S			X		X	X	2	13 x 6 x 11	15	
G	G	G	G	G	G	2		S				x		x	x	2	14 x 5 x 11.5	15	
E	E	E	E	E	E	3						x	x	x	x	2	13 x 5 x 8.8	13	
G	G		F	F		1					x	x			x	1	5.5 x 9 x 2.5	1.5	
G	G	G	G	G	G	N				x	x	x	x	x	x	7	16 x 11 x 5	12	
G	G	G	G	G	G	N				x	x	x	x	x	x	7	21 x 12 x 5	16	
G	G	G	G	G	G	3				x	x	x	x	x	x	7	20 x 12 x 5	20	
G	G		G	G		N				x	x	x	x	x	x	—	10 21 x 13x 6	21	
E	E	E	E	E	E	2						x	x	x	x	2	10.7 x 5.5 x 11	17	
E	E	E	E	E	E	2		S				x	x	x	x	2	13.6 x 4.6 x 13	18	
E	E	E	G	G	G	2		S		x		x	x	x	x	2	11.3 x 6 x 12.2	12	
E	E	E	E	E	E	2						x	x	x	x	2	17.5 x 5 x 9.5	11	
E	E	E	E	E	E	2						x	x	x	x	2	17.4 x 5 x 15	15	
E	E	E	E	E	E	2						x	x	x	x	2	17.4 x 5 x 15	16	
E	E	E	E	E	E	2						x	x	x	x	2	19 x 7 x 15	16	
E	E	E	E	E	E	2						x	x	x	x	2	17.4 x 5 x 15	16	
E	E	E	E	E	E	2		S				x	x	x	x	1	13 x 5.5 x 17	16	
F	G	G	F	G	G	1						x	0	x		N	12 x 4.7 x 8	4.3	
G	G	G	G	G	G	1						x	x			N	14.5 x 6 x 8	N	
F	G	G	G	G	G	2						x	x	x	x	1	14.5 x 6 x 10	N	
G	G	G	G	G	G	2					x	x	x	x	x	7	16 x 9 x 5	10	
G	F		F	F						x	x	x		x	x	7	19.2 x 14 x 6	16	x
G	F		F	F						x	x	x		x	x	7	22 x 12 x 5.9	18	x
E	G	G	E	G	G	1				x	x	x		x	x	2	13 x 8.5 x 4	5.8	x
G	G	G	G	G	G	2				X	X	X		X	X	2	14 x 9 x 6	14	

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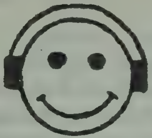
$160		Very lively little portable	RF-22
200	2.9 IF Filter	Next step up. Very good rig	RF-26
245	2.9 IF Filter	Ideal Capable Portable Standby	RF-29
439		Satisfactory Desk Model	RF-49
		Very fine and expensive	RF-90
300		Space-age computer-receiver 2001	
165M	Sharper filter	A dandy rig for the money	
140		Good but limited coverage	
360	Sharper Filter	Quite adequate desk model	
		Has everything but overpriced	
		ditto with recorder	
1250	CRF-1	Another Space-age rig- Excellent	CR
340M	Filter & D.R.O.	Excellent but requires mods.	
620M	Sharper filter	FRG-7 upgraded with D.R.O. etc.	
500		Excellent reports - R-1000 plus	
150		Handy but limited. w/clock $190	
489		Most reasonable of deluxe portable	
595		Same with stereo FM - AAA tone	
1000		Super deluxe portable Beautiful	
931		Excel Radio w/stereo recorder	
450		Old standby - One of the best	
1669		Top Drake hobby rig. Excellent	
445M	Filter & AGC	Best rig for the money - A dandy	R-1
	DR-22C-6	Excellent rig with simplified tune	
	DR-33C-6	Next step up	
	DR-44-6	The professional model	
	DR-55-6	The most reasonable w/out D.R.O.	
	DR-101-6	Same as 33 but with scan tuning	
1350	See Evaluation	Japan's answer to Drake R-7 Best	N1 51
100	DX-100	Not so hot starter rig	
230	DX 200	Has tuning and image problems	
400	DX-302	Disappointing up-grade of DX-300	
600		2nd Grade Grundig-type but good	
280		Flashy Tape recorder with radio	
420		Same but stereo - very posh	
120		Best all-wave portable for money	
380		Usual Zenith quality but untested	
		Unknown & untested	
	M = Modified		



TAIL GUNNER ON A SUPERHETERODYNE

(The Confessions of a Radio Nut)

By Larry Brookwell, Editor & President
International DXers' Club of San Diego

* * * * * * * * * * * * * * * * * * *

Reserve an autographed and numbered First Edition of the Tail Gunner by your editor and Club President. This tale has appeared in condensed form as a serial in the SDDXC bulletin for over a year and has earned many kudos. It is the semi-humorous story of the life and loves of your host and his bizarre adventures in and out of the radio business. Escaping an unfair divorce settlement becomes a fugitive, skippering the first private automobile to reach Mexico City from the border. Works as a service man for General Motors (Delco Radio) where service calls were reached by canoe thru raging rapids,installs meters in tropical Indian huts guarded by armed soldiers, just misses becoming a millionaire, twice, escapes a shot-gun marriage by fleeing in a stolen yacht,fishes commercially in Mexican waters withot license and out-foxes the Coastguard, almost builds a gambling casino and his boat sinks with all hands at the head of the Sea of Cortez.Goes into the resort hotel business in Mexico with amusing results and retires to San Diego where he establishes the hobby's most useful club and monthly bulletin.

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be needed for very weak signals at the top end of the HF band. The Preamp is non-operative below 1.5 MHz as it could interfere with strong signal handling.

2. Input selectivity is provided by 9 broadband filters, each covering part of the 0-30 MHz spectrum. [This does not refer to the standard 2.3 kHz filter nor the optional selectivity filters.] Therefore, no preselector is required.

3. The incoming signal passes immediately to a special high level double balanced diode mixer that is designed for excellent strong signal handling.

4. The first IF is at 48.05 MHz for improved image rejection. Up conversion is made possible by a phase-locked loop HF oscillator.

Important controls/functions include:

1. Five position front panel diode switched selectivity filters [can be used in any mode]. A 2.3 kHz filter is standard and 4, 6, 1.8, 0.5 and 0.3 kHz filters are optional at $52 each.

2. Passband tuning, allowing some [considerable, Ed.] flexibility in selectivity. [In my mind, this control "makes" the receiver, Ed.]

3. Receiver incremental tuner [a fine control].

4. A tunable IF notch filter [heterodyne squealcher].

5. Switchable AGC time constants [a handy tool].

6. Aux-7 option selector switch and activator [discussed elsewhere].

7. Main and alternate antenna and combinations thereof switch [a bit of gilding the lily, but useful when operating a transmitter, Ed.]

8. A crystal calibrator with 25 kHz markers [for the analog dial].

9. Digital display reads out to the nearest 100 Hz [is easy to read].

10. Control for optional impulse-type Noise Blanker [$90 is pretty stiff for this device that dampens ignition noise].

11. A "Store" button for the digital readout [rather superficial device locks readout for silly reason].

12. Control for use of digital readout as a 150 MHz counter. [Among other things, provides a digital readout for a second receiver, but you must adjust numerically for the IF frequency.]

13. Audio jack for tape recorder [on rear].

14. Jack for outboard speaker [inboard speaker is pathetic].

15. Front panel phone jack. [Drake missed the boat here. It should have been for stereo phones.]

16. Power source: 115/220 VAC 50/60 Hz or 13.8 VDC." [A very "business-like" looking panel with ample, even generous controls, Ed.]

I am still "borrowing" from Chuck's review: "Obviously, this is a high performance receiver. Sensitivity is very good. *It is likely that nothing better will ever be needed.* [Wow!] The filters [selectivity] have excellent shape factors and possess good ultimate rejection. The stability is excellent; sideband is stable within seconds of turning the rig on, making it unnecessary to chase the signal around. Image rejection is top notch. The area where the R-7/DR-7 really shines is in the mixer performance. *Third order IM figures are as good as are available today.* Blocking is practically non-existant with a mixer capable of handling such strong signals."

Chuck then goes into a rather long dissertation about "poor" audio and his disagreement with Drake's choice of broadbanding the input stage of the MW frequencies. This reveals Chuck's prime interest to be in MW DXing, not SWL. I have yet to work a Drake that had superior audio. The R-7/DR-7 is the best Drake yet in the audio department. I think Drake could have done better, but they seem to place more importance on other features. A racing automobile doesn't have a soft ride. I would rate the audio as acceptable under the circumstances. A good speaker will help. As to the presence of spurs in the MW band, it is possible these originate in other than the broadbanding as stated by Chuck in his review. Grant Manning says many different things could cause spurs and as soon as the service manual arrives, further determinations will be attempted. Hopefully, these MW spurs will be experienced only by those with powerful MWBC transmitters nearby.

Before I begin my own observations, I will refer again to the review where Chuck makes a direct comparison of the Drake and other receivers. He gives a slight edge to his R-390A on certain MW frequencies. He admits that the reported MW spurs were encountered when connected to his Beveridge antenna which is hardly fair. A Beveridge will produce spurs on a violin. (Manning, being very close to KOWN, gets spurs with his finger on the antenna connection!) This MW spur thing will be explored further and you will be advised in these pages.

Chuck continues, "As far as the SPR-4, HQ-180A and the FRG-7MOD goes, you will certainly notice improvements when switching to the Drake R-7/DR-7." Even though he clings tenaciously to his love affair with the R-390A, he admits R-7/DR-7 advantages over the 390A to be ease of repair, portability, newness (most 390s are 20 years old), digital tuning, better SW sensitivity and the ability to handle stronger signals. He fails to mention the obsolescence of some 390 tubes and the horrendous weight of the 390. It cost me $70 to ship mine to a buyer.

The AUX-7 optional Program Board mentioned above permits the operator to push button-activate up to 8 preprogrammed frequencies, regardless of where the dials may be set. Each frequency requires a crystal. The unit plugs into the R-7 chassis and the controls are already on the front panel. This device is very handy for comparative-monitoring or to have certain often-used frequencies at the ready. It does not enhance the receiver's tuning ability except for the convenience. The AUD-7 option is priced at $45. AUX-7 crystals may run from $5 to $9.50 each, depending upon supplier.

After receiving my R-7 back from the shop (see "Warning & Suggestion RE: R-7" elsewhere in this Bulletin) and being able to use both the 4 and 6 kHz filters, I am sorry (glad) to say I cannot agree with the "experts" about the poor audio. I am especially critical of unintelligible audio, having fought it with an SPR-4 up to the point of selling the set for that reason only. I will admit I don't get the gut-grabbing bass of the HiFi's, but the signal is clear and pleasant, and I am happy with it. Good audio depends very much upon the speaker used.

SWL on the R-7/DR-7: 1. All but the AM, push button in the "out" position, otherwise you receive SSB and CW and the BFO is activated. 2. AUX PROGRAM at "Norm." 3. SELECTIVITY at 4 kHz, if installed, otherwise at 2.3 kHz. 4. PBT-RIT knobs at center.

5. NOTCH at center. 6. RF GAIN full clockwise. 7. AF GAIN as required. 8. ANTENNA switch at Main/Main. 9. BAND switch set so two yellow numbers and the yellow line bracket the frequency or band you desire. 10. Push UP or DOWN button (500 kHz per push) until display includes desired frequency or band. 11. You can tune to your signal frequency using either the analog scale or the digital readout. 12. If the signal is weak, activate the PRE AMP button to increase sensitivity. 13. If the signal is cluttered, indistinct or just poor, engage the RIT button and attack the 14. RIT-PBT control. The smaller knob permits vernier tuning, and the larger knob allows you to "explore" the signal to the extent that you can "lean" to the least disturbed or interfered-with sideband (portion) of the signal. Generally, the side furtherest from an interfering source is superior. 15. If the signal has slop from a nearby signal, change your selectivity control to 2.3 kHz or, in extreme cases, the 1.8 kHz filter (if installed). 16. Further help is offered by the NOTCH control where an annoying adjacent source of interference can be dampened or nulled out. 17. As a last resort in the effort to capture that elusive signal, try exalted carrier tuning. Disengage the AM button, null the heterodyne with the RIT knob and seek an understandable signal with the PBT knob. The signal will be distorted but possibly readable. After some practice you will find the RIT-PBT and the NOTCH controls to be the means of logging signals heretofore beyond your capability. If the signal is there, you have all of the help possible to "dig" it out.

Tuning side-to-side with the Dymek DR-55 (also an excellent receiver and equally sensitive) I can find the weak signal in both receivers, but the ability of the R-7 to manipulate, refine or segment the signal and to suppress the interference makes it the better DXing tool.

Additional controls not mentioned above nor described by Chuck Hutton are:

1. AGC switch buttons: both out is "Slow;" M in is "Medium;" F in is "Fast;" and both in is "Off."

2. METER: Each "S" unit approximately 5dB. S9 is approximately 50µV.

3. LIGHTED INDICATORS: "Fixed" and "Setband" refer to the optional AUX-7 operation. "RCT" is used when a transmitter is connected. "RIT" warns disengatement after use required to return to normal both analog and digital displays.

4. MUTE button: required when transmitting.

5. SPKR button disconnects inboard and outboard speakers for phone use (usual jack switch missing).

6. FIXED VFO button part of AUX-7 function.

7. RF GAIN: Usual front end control. Usually engaged. Pull on.

8. NB button activates optional NB7A Noise Blanker. Subdues impulse noises (auto ignition, lightning, etc.)

9. Feature unfortunately not included is a spigot dispensing dry martinis.

MW DXing: I must have a superior location, or I am especially blessed, as I can't find any MW spurs or the poor audio mentioned in other evaluations. I get a certain slop from nearby Tijuana transmitters, but every receiver worked at this QTH has suffered the same. All of the functions that make for superior SW tuning (excepting the Preamp) are available for MW DXing, and comparing signal-to-noise ratio with other receivers in my stable fails to fault the R-7. Actual sensitivity is superior to all except my Dymek DR-55 which is about equal. As to the reported spurs, I can only surmise that the R-7 must be super-sensitive to nearby transmitters, possibly being affected via the electric lines. I suggest that anyone experiencing MW spurs try battery operation. If that eliminates the spurs, the factory should be called upon to furnish a line filter.

The bottom line is that the R-7/DR-7 tests out "numero uno" at my QTH, and I am happy that I chose it over the "other" rig discussed in previous bulletins. The price is high, but I am convinced that you get what you pay for: a superior piece of equipment.

Drake R-7 Problem: As reported on Page 7, Bulletin 16, the new Drake R-7 presents a problem for those who wish to tape a program while absent, using a timer to activate both receiver and recorder. You cannot tune the receiver before turning it on. The frequency must be set with the up and down buttons after the current has been turned on. The "Store" button does not affect this as suggested. If anybody discovers a solution, please advise.

Larry's Teaser: The following is a slightly abridged copy of Larry Magne's article in the November RIB in reference to the Drake R-7/DR-7 receiver. I have been careful with my abridgement as Larry is sensitive about misquotes and out-of-context excerpts. Larry's determined refusal to reveal his tuning "secrets" forcing us all to await the WRTH-80 where his article covers this as well as his suggestion to postpone purchase of an R-7/DR-7 until having read his article, leaves us with mixed feelings, and I imagine that Drake is unhappy.

Quoting from Larry's article: The Drake R-7/DR-7 is a most unusual receiver that requires very special operating technique. When operated properly it is a superb receiver. Operated conventionally it performs unspectacularly, too. Its usable sensitivity is such that it receives all manner of spurious transmitted and locally-generated signals not normally heard with other receivers. [Larry double checked this to ensure said signals were not internally generated.] As a consequence, the receiver is sometimes mistakenly rapped for loading or images. In truth, it's simply picking up things too weak for most other receivers to hear.

These, and many other misunderstandings, are not the fault of SWL/DXers. Rather, the Drake instruction manual is completely deficient in explaining how the uniquely-designed receiver should be operated. Accordingly, in the WRTH-80 review of SW/MW receivers (by Larry Magne, Ed.) there will be some information provided on how to properly operate the unit. The observations concerning power supply harmonics are correct. These are strong in the LW section and are present, but weak, in the MW range. In reality, they are not a problem in MW DXing, but the sad truth is that they would not have been there at all had Drake designed the power supply properly. This, too, will be elaborated on in the WRTH, but inexcusable as the design is, it does not impair the set's "on-air" performance to any noticeable extent, although it rules out the receiver for use within the LW spectrum. [See my notes on the next page, Ed.]

The R-7/DR-7 is not in abundant supply as yet [written for the November RIB]. Accordingly, I would suggest that those contemplating purchase wait until the WRTH-80 appears in mid-January. It not only should help one make a prudent purchasing decision, but it also gives tips on how to properly configurate the unit at the time of purchase. [End quote.] Your editor adds to this last sentence, "and it gives the factory time to correct early boo-boos."

Remarks of the editor: There were two problems in the original R-7 models: spurious signals created from a powerful nearby transmitter which overloads the front end causing spurs to interfere with normal signals close to the frequency of the strong signal. This can be alleviated by adjusting an attenuator (R1502) located on the input filter module. This is a small white gadget with a screw slot in the right rear of the left rear compartment, accessible with the cover removed. Turning to the right will decrease the sensitivity of the MW band. The second problem consisted of "birdies" in the MW/LW bands created in the power supply up-converter. The main power supply converts the 110VAC to a DC voltage of 13.8. This is then converted on the up-converter board to 24 VDC, the current used to energize the receiver. Why this method is used is not explained. Suffice to say, it is in this up-converter that the birdies are hatched. To test for these birdies, disconnect the antenna and disengage the ANT button. Birdies (heterodyne signals) heard on frequencies other than MWBC allocations are those created in the up-converter. In receivers with serial numbers above 200 (approx.) this condition has been alleviated by the addition of a 1,000 mF capacitor to the power supply. This can be seen mounted on the rear of the power supply board in the corner next to the transformer. My suggestion to operate the receiver on batteries to check out the origin of these birdies didn't take into consideration the up-converter.

I might add here that I just left my typewriter and fired up my R-7 on the MW band. It is now 0600. No sign of spurs or birdies. Tried a few weak signals.

Nice clean performance and, in comparison with other equipment, definately superior except for my old Hammarlund HQ-145 which plugged right along. I think Larry Mange's faultings were largely due to his receiver being an early model and his QTH being inferior to mine.

Spurs that Go Bumb in the Night: Reports of spurs (birdies) on the MW band of the Drake R-7 keep showing up. I wish to emphasize that at my QTH, MW spurs are not a problem, but when my R-7 was at Radio West for a filter installation, Grant reported bad spurs around 1450 kHz which is the frequency of KOWN, his neighborhood transmitter. He also reports another R-7 owner very unhappy with MW spurs.

I believe that spurs, generally born in the mixer (but in this case the digital readout is suspect), require a signal from which the birdies are hatched within the set's innards. If the birdies persist after the antenna has been disconnected, the parent signal must enter the set in some other way. So far this spur problem seems to have been restricted to receivers being worked in close proximity to powerful MW transmitters.

I have written the factory suggesting a test in "spur country" with a battery-powered R-7 in a shielded enclosure. I will report what the factory has to say. In the meantime, if any new owner has "spuritis," I suggest battery power to check for AC line signal path. Also try operation in a shielded room (inside an aluminum trailer with grounded skin).

I had hoped that Drake Engineering's letter would get here before press time. Over the telephone I was advised that Drake was aware of "spuritis" in the MW and LW bands when operated close to powerful transmitters and that, as I believed, the offending signals which caused the birdies were entering via the AC line. (Larry Magne caught this when he faulted the "poorly designed power supply.") The factory is hot on the trail of this problem and promises correction. Let me emphasize that spurs are found in the MW and LW bands only when the receiver is operated in close proximity to macho transmitters and this will be correctly promptly.

Revelation at Last: Larry Magne's long-awaited "secret" to the unconventional (his own word) tuning of the Drake R-7 is finally revealed in the WRTH-80 (arrived today from Don Erickson). It is ECSS

(Exalted Carrier Selectable Sideband) tuning, which to the uninitiated is tuning within the null with the BFO engaged. This system can be used with most receivers, with varying success, but is especially effective with the Drake R-7/DR-7 with its passband tuning. It is certainly very effective, but Larry's contention that it also improves the audio doesn't work out for me. No matter how carefully I tune, the audio remains distorted. Will another R-7 owner please report on this? This appearance of Magne's article in the WRTH just about ends our discussion of the subject as he has exhausted it.

Warning and Suggestion RE R-7: As mentioned in Bulletin 17, my R-7/DR-7 purchased from Ham Radio Center (St. Louis) arrived. The optional filters were not installed but came separately. I am not a practicing technician, nor am I a dummy, so when the owner's manual said the installation was "simple," I fired up my soldering iron and dove in. I might add that my eyesight is so bad the only things I can see well are well-stacked young chicks. I soon found that I had bitten off more than I could chew. The solder refused to flow to the circuit board foil where the filter pins stuck through the IF board. Rather than cause irreparable damage, I boxed the set up and shipped it to Grant Manning. I should have done this in the first place. I suggest, and have written the factory about it, that purchasers insist that the dealer install the options in his shop. I might add that I have made Grant very happy as he was anxious to get his hot little hands on an R-7/DR-7.

Four days later, the R-7 is back. I had burned out a diode in my fumbling around. Now to get to work on the test bench.

Jerry Lineback of NASWA on Drake R-7/DR-7: I was very pleased to read Jerry's excellent and extensive report in the December FRENDX. It is obvious that Jerry tested a receiver that contained the modifications mentioned in the SDDXC Bulletin 18. Jerry makes a side-by-side comparison with an SPR-4, an FRG-7000 (modified) and an RF-2800 for signal attenuation, station separation and weak signals. The R-7 was superior or equal in all comparisons. Jerry brings up one point I failed to mention. The high price of the Drake R-7 can be blamed partly upon features included for Ham use and of no interest to the SWL/DXer and upon the method of over-tuning to change a receiver designed for Ham use to a full coverage communications receiver. He does recognize that the extra tuning function is minimized by the absence of a preselector. I am happy that Jerry approached his test differently than my evaluation. The two reports, thus, give a very comprehensive picture. His remarks under "General Observations" are flattering and use such words as "outstanding" and "just what the DXer ordered." Now, if Larry Magne comes up with new tricks (sic) in his WRTH-80 article, we'll have it made!

Sherwood IF Filter for Drake R-7: In a letter from Larry Magne, he advises of the availability of a special 3 kHz IF filter with a shape factor of 1.8 to 1. This has been designed for the Drake R-7 by Sherwood Engeineering, Inc., 1268 Ogden Street, South Denver, CO 80210. Priced at $80.00, this filter is said to be superior to the Drake optional filters and is recommended for SW in conjunction with the Drake filters to create a very desirable array of 6, 4, 3, 2.3 and 1.8. As the position of the CW filters (0.5 and 0.3) on the selectivity board have about 5dB extra IF gain, they can conveniently be used for the SW filters (2.3 and 1.8) with the most insertion loss. The most desireable arrangement of the filters requires the removal of the 2.3 kHz factory-supplied filter from the mixer board and placed in the 0.5 kHz CW spot on the selectivity board, with the optional 1.8 kHz filter in the 0.3 kHz CW position. The optional 6 kHz filter then is installed on the mixer board, replacing the 2.3 kHz filter you removed. Finally, the Sherwood 3 kHz filter installs in the 1.8 kHz filter position on the selectivity board. Arranged thusly, the front panel switch inserts (clockwise) the 6, 4, 3, 2.3 and 1.8 kHz filters, the last two benefiting from the extra umph of the CW spots. You are warned that the removal of the 2.3 kHz filter is a tricky de-soldering job and should not be tacked by Joe Doaks. I have purchased a Sherwood filter and it is now being installed by

Grant Manning. I will report results in the next bulletin.

Sherwood 3 kHz IF filter for Drake R-7/DR-7: I had Grant Manning (Radio West) perform a filterectomy on my R-7, rearranging as suggested, and installing the Sherwood in the 3rd position. I promised a report on this filter but am sorry to say nothing spectacular has happened. The filter functions perfrectly, but is a question if it is worth the $28.00 difference in cost between it and the Drake 4 kHz option. It is possible it may have a greater value in MW DXing, but I am not capable of answering that question. Working SW, I can detect a slight improvement, but it may have been because I know it *should* be there. The difference between the two filters (Drake 4 and Sherwood 3) is most noticeable in ECSS tuning (Exalted Carrier Selectable Sideband: tuning within the null portion of the signal with the BFO engaged). As the IF bandwidths are reduced by filters, the USB and LSB "sweet spot" on this passband control approaches the 12 o'clock position. Width of the band is visible. The 4 kHz sweet spot is at approximately 9 o'clock LSB; the 3 kHz at 10; 2.3 at 11; and 1.8 at 11:30 o'clock. I find ECSS tuning on the R-7 to be most effective with the AGC at Medium, audio gain at Full and volume controlled with the RF Gain. The ECSS signal seems superior with the 3 KHz Sherwood but opinions may differ as to this difference being worth the higher cost. However, it is nice, though extravagant, to have a professional array of IF filters of 6, 4, 3, 2.3, and 1.8 kHz.

(See Larry Magne's footnote on Page 555 of the WRTH-80.)

Sherwood 3 kHz IF Selectivity Filter for the Drake R-7/DR-7 reported in Bulletins 19 and 21 as being almost identical to the factory supplied 4 kHz filter has been reborn in my estimation. It shows that a hasty evaluation can prove incorrect.

Several nights ago I was alerted by a fellow DXer to a new pirate on the air. The signal was difficult to listen to because of the low power transmitter, the distance, poor modulation and heavy static. Fine tuning my R-7/DR-7 with its passband, vernier tune and notch and selective bandwidths, I discovered that the Sherwood 3 kHz filter *did* deliver a cleaner and more intelligible signal. I feel better now about having spent a lot of dough for the filter. Please ammend my statement in Bulletin 21.

Drake R-7/DR-7 Up-Conversion Power Supply Module replacing original module discovered to be the source of birdies in the MW/LW bands. Part No. 2100418 installed corrects the problem very nicely. Your dealer will quote price. It is easy to replace.

Tahiti on 15170: Last night I enjoyed Tahiti's South Sea music for the first time in a long while. The new Drake R-7 can tune out the bad het that has clobbered this signal for a long time. I also learned a Polynesian saying I may adopt as the Club watchword: "Aita e pe'ape'a" which translates, "It's no big thing." (11825 is a clear frequency.)

Drake MR-3 Marine version of the R-7/DR-7 mentioned in last month's Bulletin. The letter from Drake which announced the new rig was unclear as to the difference between the two receivers. I wrote to Drake for more explicit information. The reply came today and I am still in the dark. I will quote from the letter:

"The MR-3 is a radio designed for the commercial marine market. The main tuning assembly (VFO) utilizes an optical shaft encoder. Pulses from this encoder tune a minor loop synthesizer, the output of same is injected as the VFO to the main radio synthesizer." (Here is where they lose me. Does this encoder cover the entire receiver frequency or just the 400 kHz segment of the bandspread?)

"A variable BFO is included so that a signal can be tuned without varying the main tuning from a prescribed frequency setting. [This is no different from the BPT tuning of the R-7/DR-7.] The price has not yet been determined, but will be competitive to marine gear in the market. [Marine gear is notoriously expensive on the same principle that a Cadillac distributor cap costs three times what a Chevy cap costs, and they are identical.]"

Drake included a brochure of the new receiver and some differences show up in the comparison of the front panels. The Band Selector switch and the Up and Down buttons are the same. (This is where my question about the "encoder" arises.) All other controls appear the same except when the standard rack and the speaker grill is on the front as well as an AC/DC indicator. Rack handles are supplied. Controls that are different from the R-7/DR-7 are: The RIT indicator is now for the BFO. The RCT indicator is now the Clarifier. The STORE button is now for DIM. The CAL button is now LOCK. The COUNT is now Clarifier. The RIT button is now BFO. The AUX PROGRAM switch is now labeled FIXED FREQUENCY. The SELECTIVITY switch is now marked Wide, Intermediate, Narrow and V. Narrow and SSB. The RIT/PBT double knob is now the BFO pitch ±3 kHz. The multiple antenna switch is now the Clarifier or vernier tuning control. The MR-3 has a front panel control or switch for AC or DC operation.

Differences in the specifications are: Modes same except LSB has BFO. Frequency Selection is the same with addition of Clarifier. Sensitivity is rated differently, so comparison difficult. Selectivity: MR-3 supplies .5, 1.7 and 8 kHz in addition to 2.3 kHz as standard. A number of other specifications are given in different form making comparison complicated. The two receivers appear quite similar except for the "optical encoder," the value of which will have to be determined by test.

A Look at the Dymek DR-22 Receiver: For someone who wants his SWLing elegant and simple and is rolling in dough, the DR-22 is a dandy.

It is a Wadley loop triple conversion rig with a panel dominated by a large red LED frequency readout in 5 kHz. (Model DR-33 reads to 100 Hz and has better SSB ability.) Coverage is 50 kHz to 29.7 MHz, 4 and 8 kHz bandwidth switch, noise blanker, etc. (See details in the advertisement on Pp. 56/57 of WRTH-78.)

To operate, just turn it on, set the Mode, tune the readout to the desired frequency and "thar she blows." The urge to fiddle with dials, knobs, switches, etc. can only be assuaged by adjusting the "Fine Tune" control, a gadget that does just that, as well as to measure frequencies not exactly on the 4 kHz marker.

It has 100 Hz markings and tunes to either side of the readout fequency. Excellent selectivity on the 4 kHz setting, and the sensitivity is good enough to require attenuation to avoid overload. The tone is genuine Hi-Fi, a welcome improvement over most "Communications Receivers."

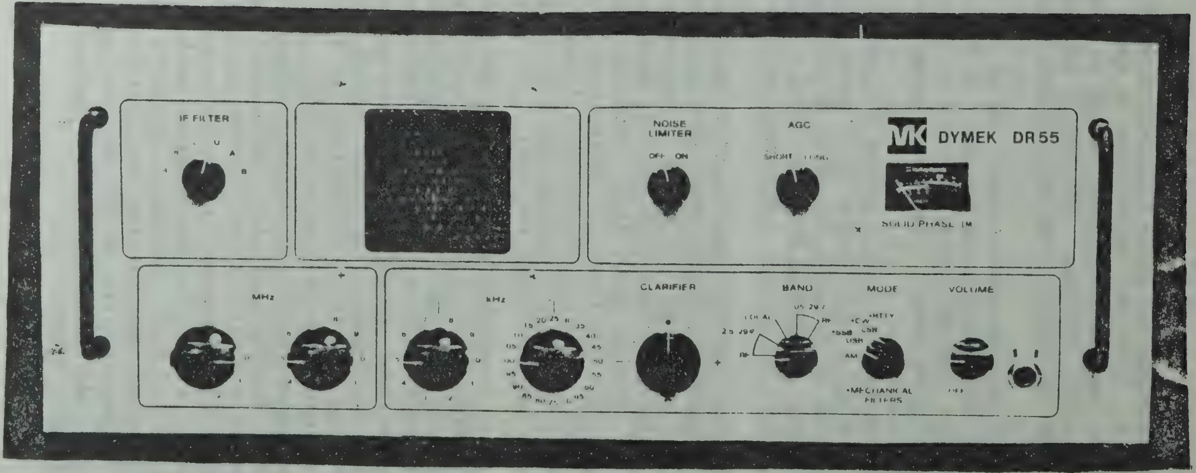
The thrill of coaxing a weak signal out of the muck by twiddling of many controls is missing. If the station is on the air, and its signal possible to receive at your QTH, it'll be there. This gizmo is deluxe to the point of boredom.

I hope my sincere praise will soften the hearts of the manufacturer and I will find a DR-22 in my Christmas stocking. The DR-22 sells for about $1,000, and the DR-33 a couple of hundred more. Calling a toll-free 800/472-1783 will get you a brochure and latest prices.

McKay-Dymek also manufactures an active antenna, the DA-100, designed mainly for their receivers, but effective on all equipment. It has a 56 inch whip for roof-top installation. The amplifier sits next to your receiver. Price is about $130. Seems to work as claimed, "equal to a 100 footer." Where there is so much "sour grapes" about active antennas, I can't undersand. Haven't been able to detect extra noise reported by those who don't have the $130.

McKay Dymek DR-55 Communications Receiver, manufactured in Clairemont, California, is a very sophisticated and professional piece of gear. It is essentially the pretigious DR-22 with some very useful refinements, but without the digital frequency readout which would be superflous as the rotary switch tuning system is accurate to 1 kHz. Eliminating the digital readout has reduced the retail price by $200.

The digital phase-locked loop tuning (triple conversion) system, together with full operational capability, provides a quartz crystal accuracy, stability and reset-ability superior to most mechanically tuned receivers. The DR-55 comes equipped with switchable 4 kHz and 8 kHz bandwidths and extra cost optional filters are available for the USB/LSB (2.2 kHz Collins Mechanical), for CW (400 Hz) and for RTTY (1200 Hz). Additional options are a preselector and a special audio output.



McKay Dymek Model DR-55 Communications Receiver

There are five tuning controls. Numbers one and two rotary switches program the MHz; number three has 100 kHz markers; number four with 5 kHz divisions; and the last is a variable capacitor called the "Clarifier" that has 1 kHz markings, plus or minus, permitting settings to the exact frequency. A "Band" switch has five positions: one for full coverage, .05 to 29.7 MHz, another for the same with a preamplifier, a position for "Local" which attenuates the input to prevent overload from nearby or blockbuster signals. The fourth position is full coverage with .05 to 2.5 MHz blocked out with a low pass filter to free the SW bands from low frequency QRM. The last position is the same 2.5 to 29.7 MHz coverage with a preamplifier. The "Mode" control selects AM, USB, LSB, CW and RTTY. The RTTY function requires an outboard converter. All modes may be operated with the 4 and 8 kHz filters (furnished) or with any of the optional filters.

Next is the volume control and a 'phone jack which accepts stereo headphones. There is also an "IF Filter" switch which inserts choice of filters into the mode in use. There is a built-in monitor speaker, and the DR-55 audio can be classed as HI-FI in comparison with most SW receivers. The audio can be further refined for outboard amplification with the Balanced Audio Output option.

A "Noise Limiter" introduces automatic threshold peak limiters into all modes. Another control marked "AGC" offers choice of high audio fidelity or fast recovery from signal fading. There is a proper "S" meter with standard readings not just a tuning indicator.

The rear panel has the usual antenna and ground connections plus a connector for the Dymek Active Antenna, a recessed switch for AC input (115/220 50/60 Hz), a protective fuse, a special high impedance outlet with a level control for the outboard audio amplifier, a jack for output from the 455 kHz IF amplifier for connection to an RTTY converter, or to an oscilloscope, a mute jack for audio control from a transmitter and an outlet for an external speaker with an internal speaker cut-off switch.

The list price is $800, 90 days cash. There is available a rental plan with option to purchase with a

$100 initial payment and $45 per month for 22 months. The set may be purchased at any time by paying 75% of the balance due plus $45 or at the end of the contract by paying an additional $45. Service and repairs are free during the life of the contract which may be cancelled at any time by return of the unit.

Detailed specifications and option costs are available by sending an SASE (legal sized) to the Club or from the factory: McKay Dymek Company, P.O. Box 5000, Claremont, CA 91711.

I have purchased one of these receivers and will publish my evaluation, after a good workout, in the next Bulletin.

My new McKay Dymek DR-55 receiver arrived today. I hooked it up and turned it on. The first signal to appear was the Volmet weather in French from Malagasy Republic on 6617 at 0235. Next, tried for Tahiti on 15170 and, at the same time, fired up my SPR-4 and the RP-8880 (Sanyo) for comparison.

All three receivers brought the signal in equally strong, but the DR-55 wasn't bothered by slop from Moscow on 15175 as was the Drake. Strangely enough, neither was the Sanyo. Then I went searching for a really weak signal. Moscow had left the air and KGEI was barely audible on the same frequency. Tried all three receivers. The DR-55 and the Drake were both able, but the Sanyo could only produce the carrier. I did some more comparisons between the Drake and the DR-55 as I must pack up and ship the Drake to its new owner. The DR-55 was equal to, or superior to, the Drake on every test I could devise.

My first impression of the DR-55 was disappointment. There is nothing to twiddle nor twist, just the "Clarifier" final tuning control covering 5 kHz, plus or minus. My first criticism was the same as when I worked a DR-22, the forerunner of the DR-55: "The ease of bringing in a shortwave signal is almost sinful and leaves the operator with the foolish feeling of having desecrated the time-proven method of twist and twiddle." Before you turn the receiver on, you can set the tuning switches to the desired frequency and set the Clarifier to neutral. Fire it up and "Thar she blows." If the signal is on the air and possible to log in your QTH, it'll be there. A small adjustment of the Clarifier, and you can go sit in an easy chair and enjoy. I call it indecent. However, your guilty feeling will go away after you listen a while. Your signal will be cleaner, clearer and more stable than you have been accustomed to. That's where your 800 bucks have gone, into quality and know-how. I am convinced that no punches have been pulled when they put this gadget together. It shows. I am not going to recommend this receiver to anyone, as 800 clams is a lot of dough to put out for a rig, no matter how good it is, if you are going to be unhappy with reception you don't have to struggle for. You will first have to resign yourself to "push button" operation without stoop, squat or squint. I'll let the above outburst stew awhile and spend several days putting this baby through its paces. I'll come back.

Four days have gone by familiarizing myself with the DR-55, and I have discovered a number of things: 1st, I made a mistake in my description of the unit in Bulletin 7. I stated that the readout was accurate to 1 kHz. I assumed that the markings on the Clarifier control were 1 kHz. This is incorrect. This control enables the operator to tune between the 5 kHz settings of the number 4 tuning switch, plus or minus to the frequency indicated. After adjusting the Clarifier, the actual frequency can only be approximated. 2nd, after having lived with the poor audio quality of the Drake SPR-4, the clarity and tone of this rig is refreshing. Voice IDs can be understood, and the music is a pleasure to listen to. 3rd, in the crowded 31 and 49 meter bands I found several spots where I was glad that I had purchased the 2.2 kHz Collins filter options for the USB and LSB modes. This receiver allows use of any filter in any mode. A weak signal buried in slop from powerhouse transmissions can be dug out with the use of the 2.2 kHz filter. Both USB and LSB settings should be tried as the skirt angle appears to differ. 4th, the sensitivity of this receiver is superior. Tropical Band signals previously wrestled with now slide in smoothly and can actually be enjoyed and understood. Signals that were identified (and reported) with tongue in cheek (sic) are now unmistakably identifiable. Feeble signals that have appeared only as carriers in the past (for me) now have developed audio. All of this sounds very flattering. I mean it to be. After all, $925.00 (receiver plus filter options) should buy something better than average.

McKay Dymek DR-55 and DA-100: I sent my new DR-55 to John Kolb to have it checked out for use with my Torrestronic Digital Display. The DR-55 has accurate mechanical readout with rotary switches down to 5 kHz, with an uncalibrated "Clarifier" (or trimmer) to tune to either side of the setting on the 5 kHz switch. I would like to be able to read these frequencies to .1 kHz as is possible on the DR-33 Professional Dymek model which sells for 1,500 smacker-oos. By connecting my outboard digital display to the "Clarifier" I can do just that. It is now connected and I can read the frequency to 100 Hz.

A nice surprise was a DA-100 Dymek Active Antenna which George McKay (of McKay Dymek) "loaned" to me. This is a roof-top four foot whip with an amplifier at its base. Coax cable leads to a control box beside your receiver. It plugs into your 120 VAC, and the "off" position of the switch cuts in your standard antenna. An Attenuator-Output Impedence switch allows matching to receivers other than Dymek. Claimed to equal a 100 foot longwire in performance.

I have a number of antennas but will use my 50 foot longwire at 40 feet in making a comparison with the Dymek DA-100. I will also compare it to my longwire tuned by a KS Preselector.

Day and night reception on all bands reveals 38 signals from 3300 to 26140 average out to an "S" meter reading of 63 for the Dymek, 59 for the 50' longwire and 66 for the longwire tuned with the KS Preselector. The signal-to-noise ratio was identical on all frequencies except for 11 and 15 MHz bands where the Dymek was noisier than the regular antenna. On complaint to the factory, I was told that each installation was different and that the noise probably could be reduced or eliminated by swinging the whip to a horizontal position. (Man made static is vertically polarized.) I'm not going to find out until I have to lower the mast for another reason. With the exception of the increased noise on 11 and 15 MHz, the DA-100 outperformed the 50' longwire, but in no instance did it exceed the sensitivity of the KS Preselector-tuned antenna.

The bottom line is this: The Dymek DA-100 is probably the best way to go for an SWL unable to install a longwire (a quick check proved it to be superior to a Mosley SWV-7 vertical) but does not offer sufficient improvement over a regular wire antenna to warrant the investment.

Dymek DR-101 Full Coverage Communications Receiver/Scanner: I had the pleasure today to test this innovative shortwave scanner. It is basically the Dymek DR-22 with the addition of RTTY and CW bands with appropriate filters and scan tuning in plce of manual control. It has the same large digital frequency display but reads to 1 kHz. Frequency coverage is the same as the DR-22 (50 kHz to 29.7 MHz) as are other specifications with the exception of the additional bands and filters.

Front panel controls are: SCAN RATE, Slow, Medium and Fast. I have named this the "Gear Shift." Next is the SCAN SPEED, left to scan down from 15000 kHz and right to scan up from 15000 kHz at increasing speeds by the turn of the knob. This I call the "Throttle." Next is the FINE TUNE, or trimmer, which functions only when in SSB, RTTY or CW; filters are introduced for ultra selectivity. Following is an AGC CONTROL with Off, Fast and Slow positions. Then there is the IF FILTER switch with six selectivity positions: AM 4 kHz, AM 8 kHz, LSB 2.2 kHz, USB 2.2 kHz, CW 375 Hz and RTTY 1200 Hz. Any one of these filters may be used in any mode. The CW and RTTY filters are options. Next we have the BAND SWITCH with five positions: RF with full front end power with frequencies below 2500 kHz filtered out; 2.5-29.7 is the same with reduced RF amplification; Local attenuated front end for overload protection on AM broadcast tuning; .05-29.7 full coverage with reduced RF; RF (upper) full coverage with full sensitivity. The MODE switch is next with AM, SSB, CW and RTTY. There is a double knob for AUDIO VOLUME and IF GAIN and a switch marked NOISE LIMITER. A jack for stereo headphones is the last panel item.

To Tune the Receiver: The digital display shows you are tuned to 1500 kHz when you turn the set on. Depending upon the scan distance to your desired frequency, you set the "Gear Shift" (Scan Rate) to Slow, Medium or Fast. If you wish to tune in the AM band, you will have to scan from 15000 to 1500 kHz in increments of 1 kHz. Slow scan would take a long time, but in the Fast position the frequencies fly by in a blur. Turn the "Throttle" (Scan Speed) to the left to scan down from 15000 kHz. You will find you can further control the scan speed with this control. When the scan frequencies on the digital display approach the desired frequency, or band, stop the scan with the "Throttle" and reset the "Gear Shift" to Slow or Medium. Now continue your scanning at a slower speed. You will find that the slowest scan speed moves about 1 kHz every three seconds giving you complete control. You can, of course, reverse the direction of the scan by turning the "Throttle" to the right. You soon learn to control the scan as you would a manually-controlled receiver. With the Scan Rate and Scan Speed controls you have the means to quickly move to any portion of the spectrum and then to scan that portion at a convenient speed. The slower you scan the more signals will be heard. Fast scan can pass by a weaker signal.

Sensitivity, selectivity, fidelity, stability and other high performance features of the Dymek line make this new Scanning SW Receiver "top drawer."

The DR-101 sells for $1,150.00 including both USB and LSB filters. A comparable SW scanner manufactured by Telefunken in West Germany sells for almost $10,000.00. The optional filters for CW and RTTY sell for $125.00 each. As with other Dymek equipment, the DR-101 may be purchased directly from the factory on a rent-to-own basis. Deposit is approximately $127.00 and monthly rental is $64.00. All rental payments may be credited to a purchase at any time.

The Bottom Line: A radical departure from normal tuning procedure such as this takes some "getting used to." The writer cautions you to avoid a hasty evaluation. Just because you fall down the first time on ice skates doesn't mean you won't learn to love skating.

Dymek DR-11 All-Wave Portable announced by McKay Dymek Company for delivery this month. The announcement in their Dymek News publication gives only sketchy detail. It has nine bands: Long Wave, Medium Wave, FM and six SW bands--16, 19, 25, 31, 41 and 49 meters. For some reason, the 60 meter Tropical Band is omitted. The set operates on 115 VAC 60 Hz and batteries. It is solid state with 31 semiconductors, easy-to-read controls with a tuning meter. Has an attractive compact cabinet with oak wood sides. Good sensitivity is claimed when used with the Dymek DA-100 Active Antenna. Selectivity must be only adequate as the announcement mentions its ability to receive SW stations "not closer than 10 kHz." It will be marketed in conjunction with the Dymek DA-100 Active Antenna for $250.00 for both units. Since the DA-100 retails for $135.00, this puts the very reasonable price of $115.00 for the DR-11 when purchased in this manner. The DR-100 will sell separately without the antenna for $150.00. It has a built-in extendable whip antenna for SW and FM. I have asked Mr. McKay to furnish me a DR-100 for testing and, if he is willing, I will report in detail with an evaluation in the Bulletin.

Grundig Satellit 3400: A very sophisticated full-coverage portable with LW, MW, 10 SW ranges (1700 to 29000 kHz), 8 SW bandspreads (10 to 60 meters) and separate FM tuner. Five digit frequency readout on all bands. A quartz GMT 24 hour clock with its own battery, which can be removed from the panel, is also a nice feature. A choice of three selectivity bandwidths appears on the set.

This 21 band receiver is a dual conversion superheterodyne with optimum image frequency reliability with quartz filter in the 1st IF and a ceramic filter in the 2nd IF. There is a trimmer for external or car antenna on SW3 to SW10 and a ceramic filter in the MW for optimum selectivity. A tuned automatic preselector is provided for all ranges. It has continuous coverage from 10 meters to 187 meters with 8 overlapping bandspreads.

Controls are: Separate FM tuner with AFC; Shortwave tuner with 10 separate range scales; Shortwave vernier tuner with 8 bandwidths (10 to 60 meters); audio volume, bass and treble controls; AVC/MVC; BFO Pitch.

Switches control: on/off; dial lights; tweeter mute; frequency display; BFO/SSB; USB/LSB; FM AVC; S Meter/batt; Auto Pre-Amp; bandwidths (3); noise limiter.

Top-side push buttons: LW, MW, SW1, SW2, SW 3-10, Record, Ant Trimmer and 6 preselected FM channels.

Built-in LW/MW ferrite rod loop antenna and extendable whip antenna for FM and SW. Dual speakers with tweeter mutable. Rear connections for exterior and car antenna, ground, FM dipole, record player, tape recorder, external amplifier, and external power supply (10-16 VDC). Operates from 110/127 or 220/240 VAC, 6 mono cells or optional rechargeable 476 battery (receiver has built-in automatic charger). Tremendous audio power and studio quality with mutable tweeter.

Dimensions: 52 x 30 x 14 cm HWD. Weight: 8.9 kilos

Price quoted by Radio West is $1,000 UPS ppd.

Grundig Satellit 1400 and 2400: Two similar full coverage portables. The 1400 has mono FM with two speakers, and the 2400 is stereo FM with four speakers. Tweeters are mutable on both recivers. Both have full coverage in nine bands including FM, LW, MW and six SW bands. The sets are dual conversion superheterodyne with four circuit bandfilter in 1st IF and ceramic filter in the 2nd. A two speed dial permits fine tuning. There's switchable muting (squelch), Local/DC switch (inside to outside anteanna), both volume and tone controls with 7 watt audio output which has superlative tone and surprising volume. The frequency readout is digital on all bands and most of the tuning facilities of the more expensive 3400 but without the clock. The 2400, in addition to the FM stereo and the extra speakers, has six pushbutton preselected FM channels and some additional FM controls.

Dimensions: 1400 - 41 x 27 x 12 cm WHD at 5.5 kilos
2400 - 53 x 29 x 12 cm WHD at 7.4 kilos

Radio West Prices: 1400 - $489 2400 - $595 UPS ppd.

The 3400 can very well be termed a professional receiver while the 1400 and 2400 are general purpose full coverage receivers with excellent shortwave performance but with more attention paid to tone and volume for home entertainment. There is no question as to the superlative quality of the Grundig receivers. The fine German quality and craftsmanship is outstanding.

Grundig KV-1000 Shortwave Converter: An interesting device permitting shortwave reception on your AM car radio. Installs in your car between the antenna and receiver. Push button switches convert 400 kHz wide shortwave bandwidths, centering at 1000 kHz on your AM dial of the 13, 16, 19, 31, 41, 49, 60, 75 and 90 meter bands. With the 19 meter band button engaged, your AM radio will tune from 15075 kHz at 800 on your dial to 15475 kHz at 1200. The better your car radio the better the SW reception. A chart of frequency conversions will have to be prepared for each band. Radio West quotes $130.00 ppd.

This brings up an interesting possibility: Why not use this device with a sensitive/selective AM table radio or portable coupled with an outboard digital readout? You might end up with a satisfactory shortwave receiver for about $300.00. AT least you would have good audio. The only AM radio I know of with a digital readout is the Panasonic RF-090, but it is a scanner and whether or not the readout could be changed to shortwave is questionable. Will someone please give this a thought!

Grundig Satellit 3400 described in Bulletin 29 failed to mention selectivity settings which give you a choice of 8, 5.5 and 2.5 kHz. Figures for the 2400 and 1400 either were not given or I can't read German. (Bandwidth in German is Bandbreitenumschaltung. The sets also have Beteuchtete Abstimmanzeige (feldstarkeabhangig) Batteriesspannungskontrolle mit Markierung fur drifit Accu; see what I mean?!)

Grundig RR-1140: Portable professional six band radio with MW, LW, SW(3) and FM stereo combined with fully-controlled stereo cassette recorder and 10 watt, four speaker output. Full coverage LW to 30 MHz SW plus FM stereo. AM and FM with separate RF amplification and selective preamplifier. Double knob tuning (normal and fine) with 6 digit LCD readout on all bands. AM and FM with IC's and multi-ceramic filter. Rotary controls for volume, bass and treble and stereo balance. Two IC output stages with 10 watts each channel into four Superphon speakers. Eight push button FM memory bank with C-MOS memory and P-MOS control and comparator. Four-times coordinated FM mixer with capacitance diodes, selective preamplifier and separate oscillator. Automatic super AFC: FM fine tuning switching automatically. Electronic muting reduces unwanted signals while tuning and memory switching. PLL stereo has automatic decoder with channel separation depending upon field strength. LED indicators for FM stereo signal, cassette recording, playback and reverse. Automatic stop at tape end. Three digit memory counter. Panel illumination switchable for battery life. Two built-in microphones and remote control stop/start. Programmable digital 24 hour GMT clock with date. Switchable 220/230-110/127 VAC, 6 mono cell batteries, built-in battery charger for optional ACCU 476 power cell. Two stage multi-match telescoping antenna. "Absentee" tuning and recording with VAT switch. Both mono and stereo recording with full control mixer.

Dimensions: 25 x 19 x 9½ inches. Weight: 21 lbs.

Special quote from Radio West: $930 UPS ppd.

Note: Although shortwave reception appears secondary to optimum FM stereo reception and recording, Grant Manning reports SW ability to be comparable to the Satellit series except for the number of SW bands.

Grundig Yacht Boy 100/120: Pocket (overcoat) sized all band portable with 9 bands covering LW, MW(AM), 6 SW and FM (100 kHz to 30 MHz plus 88-108 FM). Single conversion superhet with LED tuning indicator (magic eye, not readout). Has 9 vertical scales plus 0-100 log with side knob control, preselector, tone control, volume and mode buttons. Built-in ferrite loop for LW/MW and telescoping whip for FM/SW as well as terminals for outside antenna. Powered by either 5 AA cells or 110/220 VAC 60 Hz mains.

Dimensions: 5½ x 9 x 1½ inches. Weight: 1½ lbs.

Option: Built-in 24 hour GMT clock, wake-up with alarm or music and with switches for absentee taping. Quoted by Radio West: Model 100 without clock $150.00 UPS ppd. Model 120 with clock option $190.00 UPS ppd. (Ed.: Possibly the best all wave portable for less than $200.)

Homer EP-8 Miniature MW/SW Pocket Receiver shown in the Radio West catalog at $30.00 ppd. Only 2 x 3 x 1 inches, this cigarette pack-size 2 bander has MWBC and 3.9 to 12 Mhz shortwave. It has a built-in ferrite rod antenna for MW and for shortwave is held close to a telephone or a

Chart furnished by Deutsche Welle, Federal Republic of Germany

German Shortwave-Receivers

	Grundig		Nordmende		Philips	Schaub-Lorenz ITT		Telefunken	
	Satellit 2100	Satellit 3000	Globemaster	Globe-trotter 808	Taifun 650	touring professional 107	touring CD 108	bajazzo universal 401	partner international 101
SW frequency range (MHz)	1,6-30	1,6-30	5,9-17,9	1,58-29,9	5,9-15,45	5,8-21,85	5,8-21,85	5,8-18	2-17,9
Equipped with all SW broadcast ranges	X	X	–	X	–	–	–	–	–
Digital frequency display	–	X	–	–	–	–	X	–	–
Pre-spread SW bands / SW magnifier	8/-	8/-	2/x	8/-	-/x	7/-	7/-	1/-	6/-
Reproducibility of the frequency control	X	X	19/49mb	X	–	X	X	49mb	X
Bandwidth control	X	X	–	X	–	–	–	–	–
Double conversion	X	X	–	X	–	X	X	–	X
RF pre-stage	X	X	–	X	–	X	X	–	X
SSB reception	SSB-unit	X	–	X	–	–	–	–	–
Transistors/Fets/ICs	28	51/-/9	7/-/2	35/2/1	11/-/-	12/-/2	21/-/10	3/-/2	6/-/2
Tuning indicator	X	X	X	X	X	–	X	–	X
Connection for an outdoor aerial	X	X	–	X	–	–	–	–	–
Aerial trimmer	X	X	–	–	–	–	–	–	–
Dimensions (cm)	46x27x12	•)	37,5x20,0x9,0	40x25x12	27x15x6,0	31x26,5x8,0	31x26,5x8,0	36x21,2x9,0	28x17,7x7,5
Weight without batteries (kg)	6,3	•)	2,8	4.4	1,5	3	3,2	3,3	2,5

•) unknown at time of going into print

lamp cord. Permits good reception, especially at night, and most of the more powerful SW transmitters in the 25 to 60 meter bands can be heard on the supplied earphone. Uses hearing aid batteries. A report by Randy English in the August FRENDX remarks that the little receiver is quite sensitive and brought in RSA, DW, Israel, Moscow, BBC, Cuba and even Cairo on the first try. Tuning is tricky due to the small size of the turning dial and requires a delicate touch. The selectivity seems to be adequate for the set's capabilities. It should not be considered a toy but a very handy little receiver to take with you in your pocket to catch a wanted program away from home.

Galaxy/Hi-Gain R-1530 Specifications: This very fine receiver was discontinued three years ago because of the limited market for expensive gear. It sold for $1,550.00 and was reduced to $1,200.00 at close-out. Stock in sealed factory cartons surfaced and is being sold, with warranty, for $700.00. Below are the specifications taken from a WRTH of several years back:

Receiver Type: RF superheterodyne, dual conversion, solid state
Frequency Range: 0.01 to 30 MHz continuous
Frequency Readout: 1 kHz over 500 kHz range of PTO
Frequency Stability: From turn on, better than 100 Hz including 20% line voltage variation
Calibration Accuracy: 1 kHz with 50 kHz calibrator
Backlash: Less than 100 Hz
Metering: RF calibrated 0 to 80dB above 1µV, AF calibrated 6 to +4dBm (600 ohm balanced line)
AGC: Selectable FAST, SLOW and OFF. Attack time is less than 5 milliseconds; with slow release time 2 seconds; fast release time 500 milliseconds. Less than 6dB output change from 1 to 30,000µV.

Image Rejection:	Preselector Bypass	With Preselector
Image at 1 MHz	80dB	80dB
Image at 5 MHz	80dB	90dB
Image at 10 MHz	86dB	90dB
Image at 20 MHz	86dB	100dB
IF Rejection @ 42 MHz	50dB	90dB

Blocking: 1000µV wanted 0.1µV unwanted ±20 kHz/s causes audio to drop 2dB

	Preselector Bypass	With Preselector
Cross Modulation:	90dB above 1μV produces output less than 30dB below standard output.	84dB above 1μV for less than 30dB under standard output.
Intermodulation:	80dB	90dB
2nd Order	2x10mV=1μV	2x3mV=2μV
3rd Order	2x30mV=18μV	2x10mV=100μV
(30 kHz/s spacing)	2x100mV= 200μV	
AGC Range: Audio output change less than 5dB	10μV to 0.1 V	1μV to 0.1 V

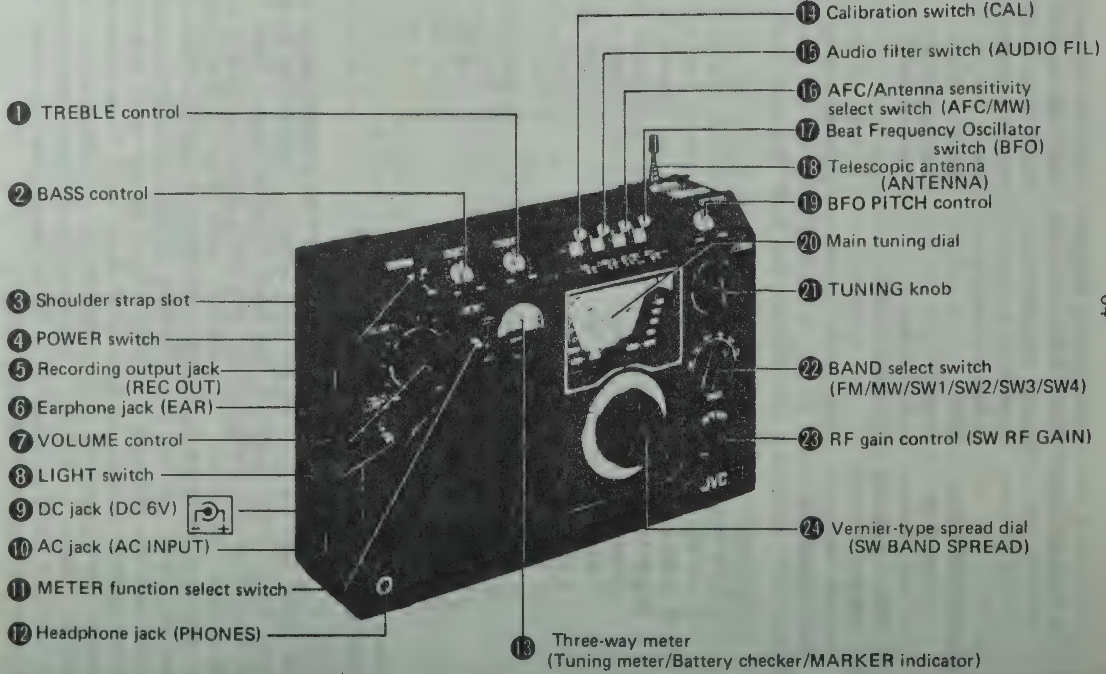
Sensitivity with 2.1 kHz filter for 10dB SN:

Frequency		
0.010 MHz	15μV	
0.05 MHz	5μV	
0.1 MHz	3.2μV	1.5μV
0.5 MHz	1.6μV	0.5μV
1 MHz	1.7μV	0.25μV
2 MHz	1.7μV	0.25μV
4 MHz	1.7μV	0.25μV
10 MHz	1.7μV	0.25μV
20 MHz	1.7μV	0.25μV
30 MHz	1.7μV	0.25μV
16 MHz	0.6μV CW	0.1μV CW
16 MHz	1.2μV SSB	0.2μV SSB
16 MHz	2μV AM	4.5μV AM
Front End Overload: (10% distort)	0.1 V	0.1 V

Hitachi KH-3800: Highly touted Japanese communications receiver that never reached our shores. According to my Hong Kong connections it has been discontinued. Report on duty free purchases from Hong Kong awaits arrival in HK of the new lines. At present, only Sony is available at the very attractive prices of $988.00 for the CRF-1, and only $193.00 for the ICF-2001 CIFUS (including cost, insurance and freight to USA). This is sea mail and it takes approximately 45 days. US duty is 9.9% and custom broker fee (required with purchase over $250.00) is $30.00. Bond is $15.00. Air freight is very expensive. My NRD-515 cost me over $165.00 to ship from Japan to San Diego via Los Angeles.

NAME OF PARTS AND THEIR FUNCTIONS

JVC FR-6600


① TREBLE control
② BASS control
③ Shoulder strap slot
④ POWER switch
⑤ Recording output jack (REC OUT)
⑥ Earphone jack (EAR)
⑦ VOLUME control
⑧ LIGHT switch
⑨ DC jack (DC 6V)
⑩ AC jack (AC INPUT)
⑪ METER function select switch
⑫ Headphone jack (PHONES)
⑬ Three-way meter (Tuning meter/Battery checker/MARKER indicator)
⑭ Calibration switch (CAL)
⑮ Audio filter switch (AUDIO FIL)
⑯ AFC/Antenna sensitivity select switch (AFC/MW)
⑰ Beat Frequency Oscillator switch (BFO)
⑱ Telescopic antenna (ANTENNA)
⑲ BFO PITCH control
⑳ Main tuning dial
㉑ TUNING knob
㉒ BAND select switch (FM/MW/SW1/SW2/SW3/SW4)
㉓ RF gain control (SW RF GAIN)
㉔ Vernier-type spread dial (SW BAND SPREAD)
JVC

JVC FR-6600JW 6 Band Receiver: A very affordable portable AM/FM4SW rig for the neophite, or as a serious "take-a-long" for the hobbyist who wants to stay in touch. Has the advantage of a tuning system which permits accurate frequency readout to 5 kHz without the expense of the digital display portables costing twice as much. It is a dual conversion superhet with surprising selectivity able to handle the wanted 5 kHz separation as long as one is not a blockbuster (which requires an investment of $1,500 to handle). This very businesslike rig sells for $169.95 but can be purchased from 47th St. Photo (36 E. 19th St., New York, NY 10003; Telephone: 800/223-5661) for $119.95. That's only 20 bucks more than the receiver evaluated last month which is vastly inferior.

Not many modern rigs without a digital display can offer accurate tuning which enables the operator to set the dials and expect to hear the wanted signal without further twiddling.

An unsual, but effective, tuning system requires first setting the "main" dial to the nearest frequency marker to the desired signal. The "main" dial is marked every 250 kHz on a four scale drum. A built-in crystal calibrator, which is also set to 250 kHz, enables the operator to "zero in" this setting. A separate bandspread dial marked to 130 kHz (either side of a zero position) enables one to add to, or deduct from, the main dial setting to arrive at the wanted frequency. For example, you want Tahiti on 15170. Set the main dial to 15250 (the nearest frequency mark) then turn the bandspread to minus 80 (15250 less 80 is 15170). The bandspread dial has 10 kHz divisions far enough apart to estimate a 5 kHz setting. This can be double checked by engaging the BFO switch to zero in the heterodyne. A second double check consists of re-engaging the calibrator to correct for drift (which is minimal before warm-up). The only drawback is the need to add or subtract to arrive at the frequency, but it is a small price to pay for accuracy at a bargain cost. The main thing is that it gets the job done admirably.

The four shortwave bands cover 1.6 to 4 MHz, 4.5 to 10 Mhz, 11.7 to 20 MHz and 21 to 30 MHz in steps of 250 kHz. Accuracy of settings to these markers is assured with the crystal calibrator which beeps every 250 kHz.

The MW band is poorly marked having only figures 54, 60, 70, 80, 100, 120, 140 and 160 making tuning a matter of approximation. The MW sensitivity and selectivity is not bad but could be much better with an outside antenna terminal. Using a Radio West Shotgun connecting to an outside antenna and laid on top of the cabinet brings the MW section to life. If there was a readable MW scale, the MW could be as effective as the SW. The FM band is good and the tone is surprising for the little speaker. The signal is crisp and clear and it is well handled with a three gang capacitor and the quadrature detector.

Controls include the aforementioned tone controls, a volume control, RF Gain, dial-light/battery-saver switch, meter function switch (tuning indicator and battery), the crystal calibrator switch, audio filter switch (dampens noise), BFO switch, BFO pitch control, band selector (FM, MW, SW1, SW2, SW3, SW4), main tuning dial, bandspread dial, a dual switch for FM AFC and a MW attenuator and the on/off control. Additionally, there are terminals for both the FM and SW outboard antennas, a recessed voltage switch (120/220 VAC), input jack for 6 VDC, two earphone jacks (small and large), recording jack, lighted main tuning dial and tuning meter, slots for shoulder straps (furnished) and the extendable SW/FM whip antenna.

SSB tuning is excellent and nice to tune with the BFO pitch. ECSS tuning is possible, but not easy.

Bad features are: lack of AGC, extreme directionality of the MW built-in ferrite rod antenna (makes for awkward positioning of receiver). Dial light reflects from metal parts obscuring readout at night, poor overall MW portion, and marginal operation on exterior SW antenna.

Although the instructions suggest use of outside anttenna to increase SW sensitivity, its use was found to introduce overload and some cross modulation. It does cut down the background receiver noise, but the whip is very sensitive and adequate for all but extreme DXing. Backing down on the RF gain kills station hets when using crystal calibrator. Power is 4 "D" cells, external 6 VDC and both 120/220 VAC 50/60 Hz; 8½ watts consumption. Weight: 6½ lbs. Size: 13 x 8½ x 4 inches WHD. Price: $169.95 ($119.95). Call toll free 800/221-7502 for nearest dealer or service.

It was discovered that the receiver is very sensitive to adjacent electronic equipment, especially in the MW band using the interior ferrite loop. Working MWBC on my test bench next to other receivers was impossible. Moving the unit away cleared the signal and permitted reception very different from my original disappointing test. I am very pleased with the little receiver and am going to rely on it for my favorite programs away from home.

Kenwood R-1000 Information: Iden B. Rogers, editor of RCMA Newsletter (Radio Communications Monitoring Association) has sent me a very extensive 10 page evaluation of the new Kenwood R-1000. As pertinent information has already appeared in Bulletin 20 with Dan Sheedy's report, and my own observations, I feel that to reproduce Iden's report in full would be repetitious. However, Mr. Rogers has really attacked the rig from all angles and has been rather critical. For anyone wishing to explore the R-1000 thoroughly, I will send a Xeroxed copy for a SASE (legal size) and $1 for Mr. Xerox.

Although some of Iden's findings are a bit derogatory, he does not "bad mouth" the rig as his final wods are, "If I had it to do over again...I would buy the R-1000 without hesitation. I like the receiver."

I will quote from his evaluation to give you an idea. Remember, however, we are discussing a receiver selling for about $400.00, not a Racal at $7,000.00 where perfection is expected. "The 2.7 kHz SSB filter should be sharper for improved SSB reception, and it is inadequate for CW." He goes on at some length as to the need for a greater selection of IF filters which, of course, is impossible at the price. He admits that. He was able to find weak birdies by "forcing" but admits no problem and declares the rig "clean" in that department.

The silly 12 hour AM/PM clock is criticized, as it should be. (This has been changed to 24 hour GMT.) He suggests that the tone control, which could be more effective with a greater difference between bass and treble, is a good idea. He criticized the "boomy" audio as being poor for voice IDs when DXing. This is normal for Japanese-made receivers and calls for the use of an outboard speaker like the Radio Shack CB base unit which is tuned for voice.

As with several other early model "boo-boos," the long AGC release time (approximately 7 seconds) mentioned by Rogers has been corrected. Spurs from nearby powerful transmitters were encountered but greatly reduced without serious loss of sensitivity by use of the 20dB attenuator switch. Rogers has a 100 foot longwire antenna at 50 feet, quite a load for a modern hot front-end circuit. He suggests a directional active antenna (Radio West) or a sophisticated preselector (Dymek DP-40) as a solution to "spuritis" in bad locations. He claims the Noise Blanker functions well when no signal is present, but poorly when introduced with a weak signal. I have never become "sold" on a noise blanker. It's about as useful as tits on a bull.

Some drift was encountered (the specs admit it) but is of no great consequence. Iden calls attention to the poor MW sensitivity listed in the specs but states there was no perceptible difference to the ear from a claimed 1.0μV on another (expensive) receiver. So, one can ignore this rating.

Iden suggests his remarks may have been "a little too critical" but one need only return to his second paragraph where he states, "The R-1000 is very compact, solidly built, attractive, stable, sensitive and easy to operate." It has "unusually clean, high quality audio, simple bandswitching, 30 overlapping 1 MHz bands, clock-timer actuates preset for automatic recording, no preselection or calibration required," etc.

Kenwood R-1000: Mr. Lineback also gives us some revealing figures on this new receiver. He remarks about the poor sensitivity of 50μV below 2 MHz (MW band). Frequency stability is also rated poor in comparison with competition. The 24 hour clock restricts the receiver to 115 VAC power. But the really bad news is in the shape factors of the IF filters: the 12 kHz AM filter has a shape of approximately 2.5-1. The factory claims good tone quality with this filter. Jerry remarks, "good tone on two stations at the same time." The "narrow" filters are rated at 6 kHz and 2.6 kHz, but the 2.7 can only be used in the SSB mode. Shape factors are 3.3-1 for the 6 kHz and 1.85-1 for the 2.7. If this last filter could be used in the AM mode, things would be different. Although the specs are poor, Grant Manning reports that the R-1000 with the sharper filter switched to the AM mode is very good. I have two remarks to make: First, specifications don't the receiver make. Nothing takes the place of actual operation. Second, it is beyond my comprehension how such prestigious firms as Drake, Radio Shack, Kenwood and Lafayette can offer to the hobby receivers before the engineering is finished.

Good Reports about the Kenwood R-1000: Although everyone complains about poor selectivity, we now learn that Kenwood has awakened and offers solutions and corrections. It is strange that competent firms do their best engineering after releasing the equipment to the public. A bandwidth of 12 kHz and a 12 hour clock on a 24 hour device is not only silly, it's dumb. Yes, the R-1000 has a switch which produces 12 hour time display on the frequency readout. I have been informed that Kenwood will furnish instructions for modifications to change the AM selectivity from 12/6 to 6/2.7 and a method to reprogram the clock to 24 hour GMT time. It is also advised that these changes have been made in new production.

More on the Kenwood R-1000: Member Dan Sheedy submits the following:

A member's letter in a recent SWL club bulletin states that the Kenwood R-1000 is supposedly the "most superior receiver on the market." Well, it isn't, but here are a few notes concerning an R-1000 that has been in use right here for several weeks.

Cosmetically, it's very nice. The digital readout and clock timer is accurate. The controls seem to be well placed, and so on. However, as pointed out in the December 1979 FRENDX, the stock AM selectivity is wide as a barn door, making all the nice touches academic 'cuz if it doesn't separate DX from junk, a pretty face and colored lights are meaningless.

Radio West modified this early-run set (#50585) to use the SSB 2.7 kHz filter (Shape 1.85-1) in the AM narrow position. [Note: Factory now supplies instructions for the purchaser's modication. Ed.] After this bit of electronic legerdemain, the R-1000 began to perform like a DX machine.

For comparison, I hooked a R-390A to the same 300' longwire and everything I could pick up with the R-390A was audible on the R-1000 and usually more readable, too. On the BCB, where the rated 50µV sensitivity would tend to make one wonder what sort of DX could be expected, the same condition prevailed. Sure, the signals were louder on the R-390A, but so was the noise. Perhaps the operative term here might be "usable sensitivity." After a certain point, increased sensitivity means increased noise (QRN is always stronger than signal in the atmosphere). The R-1000's audio reproduction, and hence readability of elusive signals, is excellent. Even the long AGC time can be put to some use: it does keep signals stable enough that weak signal readability is improved. For you "elitists" out there, ECSS is a piece of cake. (If you ask what ECSS is, you're not an elitist and don't need to know.)

Regarding two points mentioned in the FRENDX article: DC operation of the R-1000 requires instructions from Kenwood. Also, the R-1000 is not a Wadley Loop Circuit, but a PLL up-conversion (1st IF at 48 MHz) which, according to the literature, "removes any possibility of images." [The literature also believes in the Tooth Fairy.]

All in all, the R-100 has possibilities. [He likes it. Ed.] It's fun to use. It seems fairly accurate, and the lights, knobs and switches are a joy to operate. I can recommend it as a rig worth considering for your numero uno and certainly as an excellent backup receiver.

The R-1000 lists for $499.00 but is available from Radio West, 3417 Purer Road, Escondido, CA 92025 (714/741-2891) for $430.00 with the 2.7 kHz selectivity and the AGC modifications. [End of quote.]

John Kolb just brought an R-1000 over to my shack and I want to tell you *I am impressed*. In the first place, it looks like a million dollars and the modified version performs like a champion. I'll add my recommendation to Dan's; it's a winner. (P.S. PLL means Phase Locked Loop and ECSS means Exalted Carrier Sideband Shenanigans.)

Larry Magne reports in the ANARC letter than Kenwood has corrected the two shortcomings in early R-1000s and 1980 production will have the shortened AGC decay in the AM mode and improved selectivity. The AM bandwidth will have 6 and 2.7 kHz filters instead of 12 and 6 kHz. The improved receiver can be identified by the fact that the instruction manual will have a sheet indicating selectivity can be improved by moving the "3" connector.

I suggest that anyone having purchased an R-1000 write to Kenwood giving the serial number and asking if any instructions for improvement are available. The factory seems to be on the ball.

Still More on the Kenwood R-1000: After reading Dave Rains' experience with an early model R-1000 and the factory supplied modification kit in the May SPEEDX, I am convinced that a non-technician hobbyist should take the rig to a capable rapairman or technician for the installation of the kit. There are a lot of fragile doo-funnies in thar that a fumble could ruinate. The kit is BWK-1 and sells for $5.25. Dave reports that, contrary to the rumor, the silly 12 hour clock cannot be reprogrammed for 24 hour GMT time. He states the modifiction improves the receiver tremendously.

Lafayette BCR-101: The introduction of the Realistic DX-200, which replaces the discontinued perennial favorite of the neophite SWL, the DX-160, behooves us to take another look at receivers under $300.00. Aside from the portables, there are only three table models that come to mind: the DX-200 at $229.95; the Lafayette BCR-101 at $249.95; and the Sanyo RP-8880 at $279.95. The DX-200 is described but not evaluated in Bulletin 23, the BCR-101 in Bulletins 6 and 13, and the Sanyo is evaluated in Bulletin 1 with a correction in Bulletin 5. In the June issue of Radio Electronics is a good evaluation of the Lafayette, the first one to appear in hobby publications. It is a dual conversion (over 3.5 MHz) super-heterodyne with a choice of two selectivity bandwidths (8 kHz and 3 kHz). Unfortunately, the filters have poor shape factors and the narrow setting offers only a token rejection of interfering signals.

Sensitivity on the SW bands is good at 1μV and exceptional on the LW. The high image rejection rating proved to be correct on test. The dual crystal calibrator of 50 and 500 kHz insures accurage tuning on the analog readout.

A BFO Pitch control facilitates CW and ECSS tuning. The Noise Blanker suppression of electrical pulses is barely perceptable. An RG Gain permits some control over front-end overloading. A "Tracking Control" peaks the RF sensitivity and permits optimum mixer function and will not peak on an image (as will a preselector). The bandspread dial is remarkably accurate, and it is possible to interpolate frequencies to within 2 kHz. The main MHz tuning dial is sloppy and has backlash making an accurate setting quite a chore.

The BCR-101 has excellent sensitivity but becomes completely "unglued" when faced with strong signals and crowded bands in the "prime time" DXing hours. It is here where the sharper IF filters are most needed. Reducing RF Gain helps but doesn't cure the problem. The 101 is very stable, and after a short warm-up will hold well. It is well-built and a slight bump will not affect the frequency setting. The AGC is too fast and causes pumping when the RF Gain is backed off to handle strong CW or SSB. Audio is excellent and has ample power to light up a good outboard speaker. Operational manual is excellent and complete. Thus ends the Radio Electronics evaluation. It would appear to me that the BCR-101 is an honest value except for its inability to handle strong signals but, with some intelligent modifications, could be transformed into quite a satisfactory receiver.

As I have had personal experience with only the Sanyo RP-8880, which was weird but effective having a Mickey Mouse triple conversion system, I will require an evaluation of the Realistic DX-200 to be able to give a comparative evaluation of the three receivers.

More on the Lafayette BCR-101 AM/CW/SSB Receiver: Product Test Report appears in the July Popular Electronics. The subtitle reads, "A very satisfactory receiver for the SWL." I will not attempt to repeat the rather glowing report except to remark that the receiver has a phono jack on the rear for connecting a digital frequency readout. Lafayette is expected to bring out a frequency readout to be attached to this rig. Although the selectivity is listed as 8 kHz (wide setting) and 3 kHZ (narrow setting), not enough data is given to ascertain the shape factor but it does report a ceramic filter in the narrow mode. The factory specifications do not agree exactly with the tests made by the reporter. I would emphasize that this is a "bench report" not an "on the air" trial or evaluation.

The retail price is a reasonable $250. The Following are the factory specifications: Superheterodyne single conversion to 4 MHz with a 455 kHz IF; dual conversion 3.5 to 30 MHz with tunable first IF from 1195 to 1695 kHz controlled by the bandspread converting incoming signals to 455 kHz. Built-in noise blanker and a front-end tracking control. Size: 12" wide, 9½" deep and 7" high. Weight: 13½ lbs.

Frequencies	Image Rej.	Sensitivity	Antenna
A - 170-400 kHz	70dB	7µV	50-75 ohms
B - 530-1500 kHz	65dB	110µV	unbalanced
C - 1.4-4.0 MHz	60dB	2.5µV	Ferrite Loop
D - 3.5-7.5 MHz	65dB	2.0µV	on "B"
E - 7.5-15 MHz	60dB	1.8µV	Selectivity
F - 15-30 MHz	50dB	2.0µV	Wide: 8kHz -6dB
			Narrow: 3kHz -6dB

IF: 2.15 MHz and 455 kHz
Audio: 2 watts at 8 ohms
Power: 115 VAC 50/60 Hz, 13.8 VDC
For further data consult the article mentioned. Bottom line: Specifications are jolly but performance evaluation required. Help!

NRD-505 Owner's Report: SDXC member Armand DiFilippo of Philadelphia has thoughtfully sent me a letter from fellow hobbyist Kenneth Earhart reporting his experience with the NRD-505. Unfortunately, Mr. Earhart's letter is too rambling to copy verbatim, so I am extracting the pertinent information in the form of quotes. The original letter remains in my files and a copy will be furnished if requested.

Outside of being a regular hobbyist, Mr. Earhart is a monitor for the Frequency Recommendation Committee and also monitors for Israel and several others. He is a retired research chemist in his 70's and mature in his judgment. He has been using a Yaesu FRG-7 with the filter modification for better selectivity but not the fine tuner nor the digital readout. Having turned a nice deal on the market, he decided to splurge and buy himself "the best receiver on the market." (cont. on P.78)

COMPARISON CHART OF THE DRAKE R-7/DR-7 RECEIVER, THE RECEIVE
COMPANY NRD-505. Data collected from factory brochures,
is more complete because of detailed presentation of specifi-

Features	R-7/DR-7	TR-
Frequency Coverage	0.01 to 30 MHz No Gap	1.5 to 30 MH 0.01 to 1. diminishe
Circuitry	Phase Locked Loop Digital Synthesizer Triple Conversion 1st IF - 48.05 MHz 2nd IF - 5.645 MHz 3rd IF - 50 kHz	Phase Locke Digital Double 1st IF 2nd IF
AM Detector	"Synchro-Phase"	Envelop
Passband Tuning	Yes	Yes
Preamplifier	10dB above 1.5 MHz	No
Notch Filter	Tunable	No
Front End	High Level Dbl Balanced Mixer and 48 MHz Up-Conversion for handling strong signals	Same
Noise Blanker	Optional	Optional
Crystal Calibrator	Built-in 25 kHz	Same
Antenna Selector	Multiple Function Front Front Panel Control	No
Tuner	Geared Knob w/spinner 500 kHz Coverage	Same
Trimmer	"RIT" Switch & Control	Same
Analog Correction	Drake Dial Slip System	Same
BFO Tuner	No	No

PORTION OF THE DRAKE TR-7 TRANSCEIVER AND THE JAPAN RADIO
dealer's catalog and users' reports. The Drake information
cations in the brochure.

-DR-7	NRD-505	See Comments on pp. 80-81
No Gap MHz with performance	0.1 to 30 MHz No Gap	Note #6
Loop Synthesizer Conversion 48.05 MHz 5.645 MHz	Phase Locked Loop Digital Synthesizer Double Conversion 1st IF - 70.455 MHz 2nd IF - 455 kHz	
Detector	Envelope Detector	Note #2
	No	Note #5
	Automatic	
	No	
	Up-Conversion Super-Het	Note #4
	Built-in	
	No	
	No	
	Dual Speed 33 & 100 kHz per revolution 1 MHz coverage	
	Delta Switch & Control	
	"CAL" Auxiliary Knob	
	Yes	Note #5

Features	R-7/DR-7	TR-7-
Band Switch	UP & Down Push Button 500 kHz Increments	Same
Readout	Analog 1 kHz markers 500 kHz coverage 6 Digital figures to 100 Hz	Same
Accuracy	Analog 1 kHz w/Calibrator Digital 15 PPM ±100 Hz	Same
Modes	AM, RTTY, CW, LSB & USB	Same
Audio & RF Gain	Dual Knob	Same
Preselector	BPF Switch	Same
Bandpass Filters	2.3 kHz (Std) 1.8-1 Shape Options: 6.0, 4.0, 1.8 kHz and 500 & 300 Hz, all switchable to all modes including AM	Same
Selection on Panel	5 of the above	4 of the
Contacts & Jacks for Accessories	Phones - Front Panel Tape Record - Rear Digital Readout In - Rear Outboard Speaker - Rear Xmtr - Rear	Same Xtmr. Re-
Automatic Gain Control (AGC)	Off, Fast (75ms), Med (400ms) & Slow (2 sec)	Same
Tuning System	Full Electronic Passband (a la R4B)	Same
Fixed Frequency Opt.	Preset xtal-controlled push-button selection of eight frequencies	Same
Construction	Plug-in edge mount circuit boards for easy service	Same
Power	100/120/200/220 VAC ±10% 50/60 Hz 60 Watts 11-16 VDC (13.8 Norm) 3 Amps	PS7 120/ Supply

---DR-7	NRD-505	Comments
	Dial w/29 1 MHz markers	
	Analog 1 kHz markers 1 MHz coverage 6 Digital figures to 100 Hz	
	Not Specified Not Specified	
	RTTY, CW(N)*, CW(W), USB, LSB, AM(N) & AM(W) *Requires Optional Filter	
	Two Knobs	
	Automatic	
	4.4 kHz on AM(Wide) (In brochure) 6.0 kHz on AM(Wide) (In catalog) 2.2 kHz on AM (Narrow), CW, SSB & RTTY Option: 500 Hz on CW(Narrow), SSB & RTTY	
above	Filters not interchangable w/modes	
plus quirements	Phones - Front Panel Tape Record - Front Line Out - Rear Speaker - Rear Monitor - Rear Xmtr - Rear	Note #3
	Off, Fast, Slow	
	Variable BFO	
	Preset & rewritable CMOS IC Memory Bank. Push-button selection of 4 stored freqs.	Note #1
	Card Frame edge mount circuit boards for easy service	
220 Power Option	100/115/200/220 VAC 50/60 Hz 50 VA	

Features	R-7/DR-7	TR-7---
Speaker	Built-in, side grill	Same
Sensitivity SSB (LT = Less Than)	1.8 to 30 MHz LT .2µV w/preamp LT .5 w/o preamp 0.01 to 1.5 MHz LT 1.0µV	1.8 to LT 0.1 to Not
Sensitivity AM	1.8 to 30 MHz LT 1.3µV w/preamp LT 2.0 w/o preamp .01 to 1.5 MHz LT 4µV	1.8 to LT .01 to Not
Selectivity	2.3 kHz shape 1.8-1 Std. Options: 300 Hz shape 2.3-1 500 Hz shape 2.2-1 1800 Hz shape 2.0-1 4 kHz shape 2.0-1 6 kHz shape 2.0-1 5 position selector switch	Same 4 position
Drift - Stability	Better than 100 Hz	Same
IF & Image Rejection	Greater than 80dB	Same
Audio Output	2.5 Watts LT 10% THD 4 ohms	2.0
Size & Weight	13.6W x 4.6H x 13D 18.4 lbs.	Same
Prices	R-7/DR-7 Receiver $1295.00 Noise Blanker option 90.00 Program Board (AUX-7) 45.00 Filter Options, each 52.00	TR7/DR7 Power Options

Note: Drake data reviewed and certified by R.L. Drake Co.)

Gilfer assured him that it was the NRD-505.

He reports that the NRD-505 has not improved upon the reception experienced with the FRG-7 but finds the Memory Option to be very useful in his monitoring. He can program the Memory Board with four parallel frequencies (plus one on the regular dial) for quick comparison. He can "flit from one to the other for comparing signal strength, noise, QRM and general readability." But, and I quote, "that is a lot of money

-DR-7	NRD-505
	Outboard Option
30 MHz 0.5µV	1.6 to 30 MHz LT 6.5µV
1.8 MHz Given	.1 to 1.6 MHz LT 10µV
30 MHz 2.0µV	1.6 to 30 MHz LT 2.0µV
1.8 MHz Given	.1 to 1.6 MHz LT 40µV (very poor)
	AM(Wide) 4.4 kHz shape 2.3-1 (Brochure) AM(Wide) 6.0 kHz shape ? (Catalog) AM(Narrow) CW (Wide), RTTY & SSB 2.2 kHz x 2.7-1 Option: CW(Narrow), RTTY, SSB 500 Hz shape 6-1
Switch	Selectivity fixed with modes
	Better than 100 Hz
	Greater than 70dB
Watts	1 Watt 4-8 ohms
17.1 lbs.	13.5W x 5.5H x 12D 22 lbs.
$1,395.00	NRD-505 Receiver $2,275.00
249.00	Memory Option 125.00
the same	Matching Speaker 90.00
	500 Hz filter option 50.00

to pay for a push-button radio that can't do anything extra about bringing in distant stations." Note that he refers to the Memory Board option as being the only thing that surpasses his FRG-7. He further states, "I was doing OK with my FRG-7 and wish now I had gone for the fine tune modification and the digital readout." I might remark here that Drake also supplies a Program Board as an option with the R-7/DR-7 that performs the same function as the NRD-505 Memory Board using crystals instead of CMOS.

I can only wish that Mr. Earhart had given more details as to the operation of the NRD-505, especially the MW performance bad-mouthed by Larry Geller in DSWCI.

The accompanying letter from DiFilippo states that Mr. Earhart advises him to keep his Radio West modified FRG-7 instead of buying a new NRD-505.

Comparison Analysis of the Drake R-7, Drake TR-7 and the NRD-505: This comparison supplements the chart that appeared on the previous pages.

1. NRD-505 Memory System allows any frequency to be push-buttoned into a rewritable memory bank which can be re-push-buttoned for reception, no matter where the dials may be set. Idea for monitors, WWV, rapid // comparison, etc. The stored memories do not erase with the power off, but can be erased and reprogrammed at will. Drake has a bank of 8 frequencies controlled by crystals which can be push-buttoned for reception as with the NRD-505, but reprogramming requires a change of crystals.

2. New and novel low distortion Synchro-Phase AM detector allows one to choose the most interference-free half of an AM signal (actually the USB and LSB performing together) resulting in better fidelity and less interference with a narrower filter.

3. Drake allows the use of the digital readout for outboard equipment. Can be read to 150 MHz for VHF.

4. Drake has paid special attention to handling of strong signals which normally overload most receivers.

5. Drake Passband Tuning is a system which made the RB4 one of the best receivers ever produced. Hobbyists welcome the reappearance of this system as it enables the operator to switch any filter into the circuit and permits AM tuning with half of the normal bandwidth, which increases interference rejection without degrading the signal. It also eliminates the need for a separate BFO.

6. It is unusual for the Drake TR-7 receiver to function poorly in the MW band. Fortunately the R-7/DR-7 does not have this fault although there is a

tendency to overload with a large antenna. In this connection, the NRD is reported as having an MW band that is a "disaster" to the point where *no* antenna gives the best results but zilch sensitivity.

7. One odd feature of the R-7 will bother those hobbyists who use a timer to capture a wanted signal at times when the owner is not there to do the tuning. A receiver is set to the desired frequency and is connected to a cassette recorder and timed to turn on at the desired time. The R-7 will not return to a frequency automatically after being turned off. The MHz digits requite resetting with the up/down switches. I was told this resetting of the MHz frequences can be overridden by the use of the "Store" button. More later.

8. When I first became interested in the NRD-505, I attempted to locate a receiver which I could test. I telephoned a marine supply house in San Diego that sells Japan Radio marine equipment. They contacted their San Francisco distributor and was told that the NRD-505 was carried in stock and could be delivered if ordered. A retail price was quoted at $3,695.00. When told that Gilfer advertises the unit at $2,275.00, the distributor replied, "It is possible the firm is selling a discontinued model obtained at a close-out price." I am not suggesting such is the case, just reporting a rather odd discrepancy in prices.

Japan Radio NRD-505: Side-by-side with a Radio West modified FRG-7 was mentioned by Traver Smith in the December issue of SPEEDX. His improved FROG delivers about a 2 kHz plus or minus cutoff with the 2.9 kHz filter, plus a frequency reading of 100 Hz so it is no slouch.

The NRD spans about 8 kHz on a strong SW signal, but separates signals 5 kHz apart nicely. (Normal with a good rig.) The NRD "Narrow" filter duplicated the FROG 2 kHz cutoff. Signal quality deteriorates in both receivers with narrow filters. Traver purchased the 0.6 kHz CW filter so as to obtain an accurate frequency reading. (Why not use the BFO? Ed.) He also bought the Memory Board and found it useful when questing an ID because he could hold the original frequency while trying the parallels. He can push button in his unIDed frequency and continue DXing and, therefore, be able to flash back to catch the ID on the hour. (Not possible with the R-7 unless you happen to have the proper crystals.)

He praises the automatic preselector and the effective noise blanker, which on the FROG is zilch. Bottom line: The NRD-505 is a "very satisfactory" receiver. Unfortunately, Traver does not mention performance on the MW band, a very important subject especially after Larry Geller's reports in the DSWCI News.

Apropos of the NRD-505 vs. Drake R-7 Melee: I first became aware of the JRC NRD-505 when reading Gilfer's advertisement in the WRTH-79, but knowing Perry Ferrell, I was not really impressed until Larry Geller's description in Limbert's "Technical Topics" in the July DSWCI Bulletin. I was so impressed as to make inquiries within the upper echelon of SW technologists. There I learned that the Drake R-7 should also be considered and might even be superior.

In the August issue of the DSWCI Short Wave News I was delighted to find a revealing letter written to DSWCI HQ by Perry Ferrell (Gilfer's), wherein he refers to Roger Limbert as a "Technical Boffin" (am not sure what a boffin is, but suspect something like "buffoon") and goes on to say, "There are three versions of the NRD-505: ones that Larry Geller and I both have; ones that were made in 1978; and a new version upgraded at my behest (sound of trumpets) which has low pass filters to screen off spurs below 500 kHz, better AGC attack and release times, possible audio oscillation problem finally detected and eliminated, etc." Does that sound to you like the "World's Best Value in Super-Sophisticated SWL Equipment," "Nothing Short of Sensational," and "Recommended to all who can afford the finest," superlatives found in the Gilfer catalog? Sounds a bit like the cesarean birth of the DX-300.

Larry Geller then reports his impression of the NRD-505 when he got it hooked to his antenna. He was impressed with the Memory Doofunny, but if one likes automatic tuning, the Dymek DR-101 is his bag. He complains of time required to change frequencies.

It takes ten turns of the tuning knob to advance 1 kHz. He liked the broad AVC which covers 100dB, reducing volume control changes. (Big deal.) The receiver is very stable, more so than claimed. Drift is nil. Audio quality is "rather poor" and requires detuning as much as 1500 Hz to obtain clean audio (only possible in uncluttered fequencies), and on the AM narrow setting, the audio is "pathetic." Larry blames the lousy audio to poor shape factor of the filters and would change them if he knew how. The MW band is a "disaster," producing a jumble of signals, harmonics, spurs, subtractions and additions. Only by disconnecting the antenna and backing down the RF gain could local stations be tuned, thus reducing sensitivity to zilch. Feeling that some JRC employee had wired in something from the funny farm, Larry took the NRD-505 to the factory only minutes away (Larry lives in Tokyo). After checking it out in their lab, they reported everything was within specs and said politely, "There is nussing we can do for you."

Larry has saved me a bundle and has given Ferrel an "ataque" as they say in Mexico. To paraphrase: "Specifications don't a performer make."

NRD-505 vs. Drake R-7/DR-7: As stated in a previous Bulletin, I had decided to purchase one or the other of these two receivers and would announce my choice and reason forwhy. I had planned to await Larry Magne's report on a side-by-side comparison, but as he is in Geneva at the WARC convention, I may have a long wait. I have chosen the Drake for the following reasons: The specifications appear superior; the R-7/DR-7 Synchro-Phase detector and passband tuning are very desirable; the Drake has several features not found in the NRD-505 such as notch filter, multifunction antenna selector and splitter, up to five available IF filters switchable to all modes and a crystal calibrator; the Drake MW sensitivity is much superior to that of the NRD-505; the availability of the R-7/DR-7 digital readout for other equipment or another receiver; the difference in price; the more acceptable service facilities; and the disturbing discrepancy in retail price as quoted by Gilfer Shortwave and the factory distributor. In addition, what reports and comments I have been able to obtain are largely in favor of the Drake, and several negative reports have shown up regarding the NRD-505.

Upon making my decision, I compared dealer quotations and chose Ham Radio Center of St. Louis who was asking $1,150.00 for the R-7/DR-7 and $49.00 each for the filter options. UPS freight and insurance is $9.70. I purchased the R-7/DR-7 with three optional filters: 6, 4 and 1.8 kHz. The 6 kHz is for top audio quality; the 4 kHz for general SW tuning and because its characteristics best aid the function of the passband tuning system; and the 1.8 kHz for that cluttered ID. The Noise Blanker, at $90.00, is a lot of $$ to eliminate ignition noise and thunder, and they won't be available for several months. The AUX-7 Program Board (ersatz Memory Board) could be very useful for comparative monitoring, but one would require a "library" of expensive crystals. Also, I hear rumors of a substitute replacement with both CMOS memory and scanning ability.

My Drake R-7/DR-7 arrived today (10/10), was introduced to my other gear and installed in the position of honor. The big thrill of a new car, new wife or new receiver is when you first turn it on. Let it be recorded: I wasn't disappointed. Rather than rush into superlatives and paeans of joy, I'll first give it a good working over and report results later. Something that costs an arm and a leg has to be good, but the question is, "How good?"

More on the Japan Radio Company NRD-515 which was announced with a partial description in Bulletin 23 turns out to be a much finer receiver (according to the specs) than my informant had indicated. SDXXC member W.C. Klontz of Los Angeles was kind enough to send me a brochure on the 515 he received from Gilfer which reveals the 515 to be a hum-dinger. I would describe it as a Drake R-7/DR-7 without the Mickey Mouse band change system.

The heart of the rig is the digital variable frequency oscillator consisting of a PLL synthesizer with a photo-type rotary encoder. The synthesizer is phase locked with a reference crystal oscillator.

The digital VFO has no mechanical parts, backlash, reading error or secular variation. One turn of the tuning dial (kHz) covers 10 kHz in 100 Hz steps. An Up/Down button overrides the tuning dial for rapid frequency change. The band change is automatic and rapid with a single dial covering 100 kHz to 30 MHz in steps of 1000 kHz (the antithesis of the R-7/DR-7). An electrical lock freezes the frequency preventing change by vibration or accidental touch. It has continuous tuning from 100 kHz to 30 MHz in AM, LSB, USB, CW and RTTY modes. The LW/MW AM band below 1.6 MHz uses a filter-tuning circuit for superior reception. LW/MW sensitivity is less than 6μV, while higher frequencies are rated at less than 2μV in the AM mode. CW/SSB is 2μV and 0.5μV. Panel choice of selectivity bandwidths furnished with the receiver are 6, 2.4 and 0.6 kHz with a space for an additional optional filter. All filters can be used in all modes.

There is a combination BFO pitch control and MW/AM Preselector. Two side-by-side controls (PBT and RIT) provide Band Pass Tuning and vernier tuning control without changing the frequency readout, similar to the highly touted R-7/DR-7 system with identical controls. AGC has Off/Fast/Slow settings. There is a switchable Noise Blanker. A three position Attenuator switch is marked Off/10dB/20dB for control of front-end overloading. Up-conversion double superhet converts frequencies of 100 kHz to 30 MHz in the last IF of 70.455 MHz. A crystal filter in the 1st IF suppresses interference. The 2nd IF is the usual 455 MHz. Construction is modular with plug-in circuit boards. The receiver is compact and lightweight measuring 5-1/8"H x 12-3/4"W x 11-3/4"D and weighs 16½ lbs.

An optional Memory Board is available with 24 channels in a matching cabinet 2 inches in height to be placed on top of the receiver. This is a separate unit and has nothing to do with the operation of the receiver. It merely adds automatic push-button tuning for 24 frequencies preprogrammed from the receiver into the memory bank.

My NRD-515 Receiver arrived from Japan via Korean

Airlines freight in an overnight flight. The documents which enable one to rescue the shipment from Customs took five days via our beloved post office department. Another three days of July 4th weekend had me wishing I had specified Sea Mail, which only takes 30 days. I could have saved over $150.00 for transportation. However, I was anxious to get the receiver before the ANARC Convention.

The very business-like looking receiver was hooked up in short order and subjected to first impressions. It was discovered immediately that this receiver was almost boisterous in its eagerness to perform. Naturally, this power also amplified the QRM/N and the cluttered signals, so the first impression was bedlam. However, if one keeps a firm grip on the volume control, one can avoid injury from the receiver's exhuberance. In some cases I found it prudent to back down on the RF Gain to keep a strong signal from "choking-up."

Selectivity is more than adequate. Surprisingly, the 6 kHz IF filter appears to handle most traffic. The 2.4 kHz narrow filter easily conquers 5 kHz separations of strong signals. However, the narrow selectivity ruins some very fine audio and indicates an intermediate filter of about 4 kHz to be a sensible option for the vacant AUX bandwidth choice. The 2.4 kHz filter also reduces volume to a degree. Compensating IF amplification would have been nice. Intermodulation, cross modulation, spurious signals, images and birdies, which plague most "hot" new receivers, seem to be well under control and have been pleasantly engineered out.

I purchased the Memory Unit which permits storage of 24 frequencies for immediate recall with the touch of a button. I personally think this is gilding the lily and an expensive gadget. However, it increases the desirability in a resale and also enables time-clock taping of a wanted signal. Like the Drake R-7/DR-7, the 515 will not return to a frequency after being turned off. It has to be retuned. The Memory Unit requires batteries to hold a memory for longer than 2 or 3 hours.

The NRD-515 is sitting next to my Drake R-7/DR-7 and is connected to the same antennae and speakers.

The throw of a switch enables instant comparison. So far, the 515 seems to be more sensitive than the Drake. The NRD-515 2.4 kHz narrow filter produces selectivity equal to the Drake 2.3 kHz filter. The two receivers seem to be very much alike except that the Drake is calmer in its performance. As stated before, the NRD-515 seems to be more "aggressive," if I may use this expression.

Both receivers are unquestionably fine and are probably equal in ability. However, there are obvious differences. The Drake has a cumbersome Mickey Mouse band change system, and tuning several frequencies in more than one band can be aggravating. (I believe these shortcomings have been corrected in the new MR-3 Marine Model of the R-7.) The NRD-515 tuning system is straight-forward with a simple 29 step MHz dial with frequencies marked on the dial and digital display. The main tuning dial controlling the kHz tunes 10 kHz per revolution in steps of 100 Hz and is aided by Up and Down buttons to speed frequency change. There is a "LOCK" button that prevents accidental detuning with careless movement or vibration. A switched fine-tune control with a lighted indicator tunes ±2 kHz without changing the frequency readout. These controls offer a simple and rapid method of covering the entire spectrum.

Another difference is the price. The Drake R-7/DR-7 now sells for $1,669.00. Gilfer is quoting $1,300.00 for the NRD-515. The new west coast dealer (still a secret) has not yet established his price, but I expect it may be more reasonable. The Memory Unit option will run about $250.00.

To make this evaluation complete, I will repeat and enlarge upon the description and specifications given in previous Bulletins.

Controls and Observations:

1. The MHz Dial covers the frequency range of 100 kHz to 30 MHz in one revolution of 29 steps of 1 MHz each. The frequencies are marked on the dial itself and are displayed on the digital readout.

2. Earphone Jack disconnects speaker output. There is no inboard speaker.

3. BFO and BC Tune Control: BFO Injection control doubles-in-brass as a preselector when AM mode is

operative. This PS function is very effective and enhances efficient MW DXing. Further aid is the ATT function described later.

4. RF Gain Control permits balancing of amplification in two portions of the circuit to obtain effective control of an incoming signal.

5. Main Tuning Control (or kHz Dial) controls kHz in steps of 500 Hz with 10 kHz per revolution. Has a sub-dial (or skirt) marked in 500 Hz divisions. This control will not only exceed the MHz range but will tune the entire spectrum without resetting the MHz control. This is not common practice. (Note: If the receiver is turned off or disconnected, the last dialed frequency will be erased and must be retuned when the set is reactivated. For time-clock reception and taping without operator, the Memory Unit is required. The Drake DR-7 is the same.) Operation of this Main Tuning Dial is registered on the digital display except when locked out with

6. the LOCK Button engaged. This control prevents accidental detuning with careless movement or vibration. It also permits calibration of the subdial markings with the frequency display.

8. AF Control (similar to an RIT) is a tuning vernier or fine-tune covering ±2 kHz without disturbing the digital display. It can be disengaged with a switch and has a lighted indicator above the digital display. It is helpful when using ECSS tuning.

9. AF Gain is the audio control. It is used with the RF Gain and will sometimes improve both selectivity and noise suppression.

10. PBT Control (Pass Band Tuning) is a sophisticated aid to SW tuning in that it permits exploration of both upper and lower sidebands of an incoming AM signal. It also permits shunting to one side an interfering signal. (An AM signal consists of two parallel sidebands (upper and lower) which are received as a single signal in the AM mode. Single Side Band tuning deals with only one sideband. The Drake R4 series and the R-7/DR-7 have this PBT function.) In the NRD-515, the PBT is available only in the SSB or CW modes. (Drake supplies PBT in the AM mode.) This difference is not important as any

signal requiring PBT handling also requires ECSS tuning which is accomplished in the SSB mode.

11. AGC Switch with Off, Fast and Slow, handles automatic gain, a function controlling fading and surge. Engagement reduces volume slightly.

12. Mode Switch offers choice of AM, USB, LSB, CW and RTTY.

13. Bandwidth Switch allows choice of 6 kHz, 2.4 kHz, 0.6 kHz (optional) and AUX (optional). For AM reception the 6 kHz delivers fair selectivity and excellent tonal quality. The 2.4 kHz filter is required for crowded bands but degenerates the tone quality. The optional 0.6 kHz filter is required only for RTTY. Your editor recommends a 4.0 kHz (approx.) filter for the AUX setting which should give adequate selectivity for most tough conditions without such radical degradation of the audio.

14. ATT Switch is welcome in cases where nearby powerhouse MW transmitters overpower the receiver's front end. Attenuation of both 10 and 20dBs is available.

15. The PWR Switch is for On/Off.

16. Monitor is a function connected with transmitter operation.

17. NB Switch (Noise Blanker) suppresses pulse noise such as auto ignition.

18. VFO Switch is also part of your transmitter operation.

19. AF Switch (RIT) referred to under 8.

20. & 21. Up and Down Switches override main tuning control to speed up frequency change.

22. Digital Display reads to 100 Hz with six digits. In the USB/LSB mode reads suppressed carrier.

23. EXT. VFO warning lighted indicator (transmitter operation).

24. True "S" Meter calibrated up to the 9th division of "S" units with 20dB steps above. Functions only with AGC engaged.

Memory Unit:

1. Digital Display indicates chosen channel.
2. Channel Knob selects 1 of 24 channels.
3. Memory Button injects frequency displayed by the receiver into memory bank in channel selected.

4. Preset/Manual two position button: Preset activates replay of chosen channel (overriding frequency receiver-tuned and digital display). Manual position permits injection of chosen frequency with the Memory Button into the bank. The interconnecting cable contains switching and power. Three AA batteries should be installed inside the cabinet to hold memory storage for longer than two hours (normal). The NRD-515 permits fine tuning or correction for station drift of a frequency extracted from the Memory Unit. The AF Control remains in the circuit for that purpose.

NRD-515 Features:

1. A digital VFO system employs a combination of photo-type rotary encoder using light emitting diodes with a PLL synthesizer controlled by a reference oscillator of superior stability, thus assuring accuracy and overall stability. Since this system has no mechanical or moving parts, problems of backlash, calibration error and temporary variations are elminated. The synthesizer is encased in a die-cast eluminum case to insure stable operation.

2. The Main Tuning kHz Dial produces pulses which control the frequency change at the rate of 10 kHz per revolution in steps of 100 Hz. This is aided by Up and Down buttons which speeds frequency change. An electrical lock is provided for protection against accidental detuning by careless touch or vibration.

3. A Memory Unit with 24 channels is optional. Twenty-four frequencies can be stored for instant push-button recall. It also provides a method of time-clock tape recording of a chosen frequency which is not possible with a receiver with a PLL synthesized tuner (also Drake R-7/DR-7). The Memory Unit multiplug on the rear of the receiver can be used for control of a microcomputer or other peripheral devices.

4. All-Wave, all-mode, variable bandwidth with continuous coverage of from 100 kHz to 30 MHz in AM, USB, LSB, CW and RTTY modes. Selectivity filters switchable to all modes. MW/LW AM reception is routed through a filter-tuning circuit to insure excellent tonal quality.

5. Up-Conversion double superheterodyne circuit converts frequencies in a 1st IF of 70.455 MHz. A high performance balanced mixer is featured in the input

stage, and a crystal filter is inserted in the 1st IF assuring optimum performance with control of proximity interference.

6. Passband Tuning supplies independent control of signal sidebands in all SSB and CW modes as well as for ECSS tuning.

7. All tuning and switching is done electronically thus avoiding mechanical failture and worn controls.

8. Fully solid-state with low-drain Schotty TTL, ICs and CMOs keeps power consumption low. Full modular construction with plug-in circuit boards eliminates complicated wiring and facilitates service and replacement.

DXing the MW Bands: I am not the proper person to evaluate MW DXing performance as I have not become involved in that portion of the hobby. I can only make comparisons with the Drake R-7/DR-7 (with the up-conversion power board replacement installed) which I assume to be acceptable.

In the first place, let me note that my QTH has never produced anything outside of weather on the LW, so we'll have to skip that, although the 515 seems to be very alive below 500 kHz. Also, I am very close to the Tijuana MW stations which play havoc with normal reception.

Switching from receiver to receiver with MW stations, strong and weak, fails to show any marked difference. However, the noise on the band between stations seems to be greater with the NRD-515. What this means, I don't know. It may be the extra horsepower showing up. Suffice it to say, the Japanese rig seems to have more power, but it doesn't bring in any fewer or more stations.

Condensed Specifications: Range 100 kHz to 30 MHz // Modes: AM. USB, LSB, CW and RTTY // Receiving System: Double Superheterodyne with IFs of 70.455 MHz and 455 kHz // Sensitivity: Below 1600 kHz SSB and CW, less than 2μV, AM less than 6μV, over 1600 kHz SSB and CW, less than 0.6μV. AM less than 2μV // Selectivity: 6.0 and 2.4 kHz standard. Options: 0.6 kHz and a choice in AUX (Recommended AUX option approximately 4.0 kHz) // Image Suppression: More than 70dB // Stability: Less than 50Hz per hour after warm-up (No drift noted.) // Antenna input: 50-70 ohms unbalanced // Audio output: 1 watt at 4 ohms with less than 10% distortion. Recording output: 1mW at 600 ohms. Earphones: 4-8 ohms // Power settings: 100, 117, 220, 240 VAC 50/60 Hz // Dimensions: 340 x 140 x 300 mm WHD at 7½ kilos// Specs for transmitter connections omitted // Price: Approximately $1,300.00; Memory Unit, approximately $250.00 (size: 340 x 50 x 200 mm) // Shape factors of IF filters listed as "more than" and "less than" preventing compilation of accurate factors, however, actual performance disclose quality filters // Battery Operation: Will contact factory regarding possible adapter // Matching speaker available, price unknown.

Bottom Line: We seem to have a very fine piece of gear here or, as Larry Magne would say, "Superlative." As soon as they new west coast dealer (big secret) establishes his retail price, we'll know how much of a loan will be needed from the bank. Watch the SDDXC Bulletin for the latest dope. (Where else?)

ECSS Tuning with the NRD-515 and other rigs: Exalted Carrier Selectable Sideband tuning is a method of tuning an SW receiver equipped with a BFO (Beat Frequency Oscillator required for CW reception). Effectiveness of ECSS ranges from poor (with a receiver equipped only with a BFO switch) to excellent (where there is a variable BFO ((CW Pitch Control)) and a Passband circuit). ECSS tuning consists of tuning within the null between the two heterodynes (whistles or squeal) which appear on both sides of an AM signal when the BFO is engaged. This small tuning area requires extreme care in tuning to locate an understandable signal. Although the signal may be distorted (but, hopefully, intelligible) it will be free of interference. The NRD-515 allows excellent ECSS, producing almost natural audio in the null.

NRD-515 Modified Update: It is strange to me that many of the more responsible manufacturers, in their attempt to design a sophisticated DXer's tool, seem to ignore the value of good audio. The SW receiver is not expected to function as a HiFi music box, but clean audio is as important as sensitivity and selectivity in the capture of elusive signals

After subjecting a virgin signal to the torture of an FET front end, multiple conversions, various ceramic, crystal and/or mechanical filterations and other manipulations, the product may emerge badly battered and squeezed out of shape. Drake is especially culpable, and I disposed of an otherwise excellent SPR-4 solely because of lousy audio. Even the touted R-7/DR-7 leaves much to be desired in the audio department. It is apparently not considered that legibility (readable audio) is one of the requisites for satisfactory reception of shortwave signals and I expect, for economical reasons, IF filters are chosen as compromises between "the best" and "acceptable" in order to "get by" with only two choices for AM reception. No matter how successful a receiver may be in extracting wanted signals from cluttered and noisy bands, if the resultant signal is distorted or muffled, the ID may remain hidden. Most of the degredation occurs in the IF filter circuits and, unfortunately, the sharper the filter, the greater the distortion. I hold that all receivers in the "expensive" class should supply a greater selection of bandwidths. Even the older "good" receivers, such as the various Hammarlund models, supplied up to 5 bandwidths, although the filter quality did not match present-day products. For some reason, beyond my limited knowledge, the NRD filters of 6 and 2.4 kHz seem to degrade the signal more than the shape factor would indicate. As stated above, these filters were chosen as compromises as the 6 kHz one produces "good" audio while still permitting fair selectivity (better than most 6 kHz), and the 2.4 kHz filter produces excellent selectivity at the cost of badly degraded audio. The answer is, naturally, additional filters. SO, my NRD-515 went into surgery at Grant Manning's Radio West Infirmary. Dr. John Kolb did the operation, and finding the 6 kHz filter hindering quality audio, added an 8 kHz Collins mechanical filter as well as the requested 4 kHz unit for better legibility with adequate selectivity. The results are "what the doctor ordered," a nice crisp, clean and pleasing audio for enjoyable listening with the 8 kHz and greatly improved audio and readibility with the usually adequate selectivity of the 4 kHz unit. An added, and unexpected, bonus was an improved

ECSS signal. Even without the additional filters, the 515 offers very superior exalted carrier tuning. It is possible, with careful tuning, to produce a distortion-free signal. I found the CW setting, rather than SSB, permits better control of the signal when attempting ECSS tuning.

The new 8 kHz filter gives some very nice audio on the MWBC band which, by the way, with the assistance of the preselector (for MW only) seems very hot. I was able to bring in some hither-to-now unobtainable stations.

I continue to operate the 515 beside the Drake R7/DR-7 and compare the performance by a means of evaluation. I won't say that I am amazed (which sounds too corny) but I will report that my original estimation of almost equal ability of the two receivers has been revised to favor the NRD-515 in a number of ways:

1. The straight-forward two-knob tuning system, with its 29 position MHz rotary switch and the main bandspread tuning dial with 100 Hz steps (which covers 1000 kHz at 10 kHz per revolution) with an assist from an up/down lever to speed operation as against the Mickey Mouse DR-7 add-on of the Drake R-7 (which requires step-by-step up or down approach to the desired tuning band ((there is also a 12 second warm-up delay))) *after* you have already selected a segment of the overall range on the rotary band switch. Only then can you attack the kHz on the bandspread dial which covers 500 kHz in 1 kHz steps (analog) at 25 kHz per revolution. This bandspread dial has a supposedly advantageous over-run of plus 135 kHz and minus 225 kHz, which can be very confusing if you are operating the up/down buttons of the MHz setting if the bandspread dial has been left within the over-run. Invariably, you discover that you haven't gone far enough or too far and have to correct. The Drake over-run is contained within the limits of the mechanical tuning dial, while the NRD over-run is limitless, being electronic, and the entire spectrum from 0 to 30 MHz can be tuned without resort to resetting of the rotary band switch. The band switch merely speeds the process of going from band to band; tuning is further speeded with

the up/down kHz lever. Going from a frequency in the 60 meter band to one in the 15 meter band with the NRD is a matter of seconds while the same change with the Drake is complicated and time consuming. This is especially annoying when attempting to compare station parallels. Both receivers have up/down controls, but the Drake is for band change while the NRD is for frequency change; one slows the tuning down while the other speeds it up.

2. Further comparisons of the tuning systems includes the vernier or fine-tuning methods. The 515 has a "lock" on the bandspread dial which disconnects the electronic control that protects against frequency change by vibration or careless movement. the Drake permits the same correction with a movable friction-held skirt. Both receivers have a vernier control of ±3 kHz, but the NRD knob does not affect the digital frequency readout so does not have to be returned to "0" or disconnected to avoid mismatching of the analog and digital readouts, as is the case with the Drake system. The NRD vernier can be fine-tuned to a signal extracted from the receiver's memory bank, an important feature as often a signal will have drifted at the transmitter since being stored in the memory facility. Also, if this signal is found to have degenerated, it can be switched from AM to CW mode in order to utilize ECSS tuning.

3. Another plus of the NRD is its ability to produce an undistorted signal in exalted carrier tuning. Some observers fault the NRD for not supplying passband function in the AM mode. I find this insignificant as the requirement for passband tuning only occurs when the receiver is operating in the SSB, CW or RTTY modes. I find ECSS tuning most effective (with the NRD) in the CW mode as then the BFO pitch control is engaged. Also, if the AGC is turned to OFF and the RF GAIN used for volume control (with the AF GAIN on full) a better signal can be realized. The NRD-515 is the only receiver I have operated that will produce an undistorted signal in the ECSS tuning process. Larry Magne disagrees.

4. Lastly, the superior audio of the NRD over the Drake, both with filter modifications (Drake: 6, 4, 3, 2.3 and 1.8 kHz; and NRD: 8, 6, 4 and 2.4

kHz) produces more readable signals under adverse conditions. Of what value is sensitivity and/or selectivity if the resultant signal is unintelligible?

JRC NRD-515: For those wishing a more detailed and professional evaluation of the NRD-515 than my contribution of last month, I recommend Robert Foxworth's excellent coverage in the August FRENDX. Robert agrees with me that the NRD-515 is superior to the earlier NRD-505 and that it compares favorably with professional receivers selling for $5,000-$10,000. He states that it has 90-95% of the capability of the Watkins-Johnson and Racal-type of receiver. He even devotes a paragraph to a comparison with the Watkins-Johnson 8718 showing the superiority of the more expensive receiver to be superflous as far as a SWL and DXer is concerned.

Robert quotes a price of about $1,400.00 and $250 for the memory unit and lists Gilfer as the representative in the USA. As stated in Bulletin 27, a new dealership is being established on the west coast, and the price may be more reasonable. JRC will set a factory-recommended price in Japanese Yen, and fluctuation of the exchange rate will affect the US price.

One observation regarding the sensitivity of the NRD-515 to various types of antennae is interesting and behooves further study and experimentation. Fortunately, I have a number of antennae and will report the behavior of the rig on the several types. I sent my receiver to Radio West for installation of a 4 kHz IF filter in an attempt to improve the audio and still retain selectivity.

Mini-Evaluations of Older Receivers: Pursuant to the lead article of last month's article relative to used receivers, I will this month attempt to better identify military or surplus receivers most popular in the hobby.

Almost all of these receivers were designed by Collins under government contract but were also manufactured by other firms such as Motorola, Amelco, Electronics Assistance, Imperial Electronics, Stewart Warner and others. In most cases there is very little difference, and parts are interchangeable. The big drawback to most of these receivers is the military requirement of ruggedness which increases the weight to an uncomfortable extreme with some rigs approaching 100 pounds. Another fact, which must be recognized, is the obsolescence of some tubes and electrolytic and paper condensers, which restricts your replacement sources to specializing outlets.

You are also cautioned to check for worn gears in receivers having had more than normal usage. These can cause annoying backlash and sloppy tuning control. Of course, the use of the unit is very important, and you must judge to the best of your ability if the rig has been subjected to excessive use or abuse. Most of these receivers were manufactured in 1957-1960 and may have seen rough treatment, while others may still be in original packing. Military use can be strenuous but hobbyists take better care and even improve on the original with modifications.

Prices vary tremendously. The popular R-390A is seen occasionally at swap meets for as low as $250.00, but it mostly brings $400.00 to $500.00 or higher for a well taken care of or almost new unit. Three sources are surplus stores such as Fair Radio Sales, individual specialists or advertisements in publications such as QST, 73, CQ and Ham Trader. (See addresses later in this article.)

Most of the surplus receivers cover 500 kHz to 30 MHz with the exception of some models restricted to less spread. Also, most of the rigs use triple conversion superhet below about 8 or 10 MHz and dual conversion in the higher frequencies. Most have a digital readout using an odometer-type display (not LED) accurate to 1 kHz. Some have conventionally scaled dials. All are sensitive as the military required, although claimed values do not equal published values of certain modern receivers. This is due to the official figures being actual while commercial figures tend to oversell. All use vacuum tubes although many have been modified with solid state power sections. All are ruggedly contructed and are larger and heavier than commercial rigs. Most are rack mount styled and have handles. Very few, if any, are obtainable in attractive cabinets. Most have metal cases.

I will discuss models in decreasing popularity order and, consequently, decreasing value. The most popular models are the R-390 and R-390A. The letters URR mean Universal Radio Receiver and a self-contained device. They are usually tacked on the model number, but we will omit them for brevity.

Both the R-390 and R-390A are Collins' design and almost identical except for mechanical filters in the R-390A replacing less effective crystal filters in the earlier R-390. These mechanical filters are superior to those now manufactured by Collins for the trade. A replacement from Collins brings $150.00.

Coverage is continuous from 0.5 to 32 MHz in segments of 1 MHz each except for the 0.5 to 1.0 MHz MW band expanded to 500 kHz.

Sensitivity is rated as 4 to 5μV for a 10dB signal. As explained above, this figure is "real." This is ideal for the purpose for which the set was designed: "Use in a high signal density environment," and it is especially free of images and spurs. In the case of the R-390A, selectivity is obtained and controlled with mechanical filters of 16, 8, 4 and 2 kHz with shape factors of 1.85, 1.46, 2.00 and 1.2 to 1. The 0.1 and 1.0 bandwidths are achieved using summation of the 2 kHz mechanical filter and a crystal filter. This totals six bandwidths for selectivity control.

Stability is not rated, but 100 Hz per hour of mid-term drift would be the worst that could be expected. Strong signal handling capability is probably the best that has been available up to the advent of the Drake R-7/DR-7. Image rejection is "tops," and even "forcing" fails to produce them in any band. A 100 kHz crystal calibrator permits full correction of all frequency change calibrations.

There are 25 controls: 20 on the front panel that permit full control of the receiver's capabilities. These receivers are considered by many to be the "ultimate" in design and performance. I would suggest that only the new Drake R-7/DR-7, the Japan Radio Co. NRD-515 and, of course, the English Racal receivers could be expected to outperform the R-390A. Size is 10½" H x 19" W x 15" D. Weight is 75 lbs. or 84-85 with cabinet.

Next, we have the R-388 which is also a Collins' design and was manufactured by other wartime suppliers. The main difference between it and the R-390 & R-390A is slightly smaller size and less weight and a dial tuning system as opposed to the odometer display. The circuit is the famous Collins' PTO (Permiability Tuned Oscillator) with a twist. Band #1 (0.5 to 1.5 MHz) uses triple conversion with a 1st variable IF of 11.5/10.5, a 2nd variable IF of 3.5/2.5 and a fixed 3rd IF of 500 kHz. On Bands #2 and 3 (1.5 to 2.5 MHz and 2.5 to 3.5 MHz) single conversion down to 500 kHz is used. This is because these frequencies are used as the 1st IF in the rest of the bands. So, on Bands 4-30 MHz, it becomes dual conversion utilizing the 1st IF of 2.5/1.5 on even numbered bands, and a 1st IF of 3.5/2.5 on the odd-numbered bands. This system reduces the image problem. However, it creates an unusual frequency readout: Bands 1.5 to 2.5 and 2.5 to 3.5 read backwards (or the reverse of the other bands) those kHz frequencies being marked in red on the scale. With the aid of a 100 kHz crystal calibrator, the dial readings are accurate to 1kHz. There are thirty 1 MHz bands covering 0.5 to 30.5 MHz.

Sensitivity is rated as superior to the R-390 and R-390A, being given as 1μV at +10dB S+N/N on all bands. Stability is superior to the extent that the rig can be used for RTTY copy. The IF system uses a single crystal and the five position switch, in conjunction with the phasing control, can produce selectivity rated at 6 kHz at the "0" position to approximately 300 Hz at position "4." The Collins non-military version is the 51J-3. An improved model (51J-4) has mechanical filters replacing the R-388 system. The controls, although not as numerous as the 390, are adequate for full control of the receiver's functions.

Prices in the used market are about the same as the R-390A, as the lesser weight is a large plus. Both the 390s and the 388 have inboard power supplies that require 115 VAC 50/60 Hz. A word of warning: The 388 is not so hot on SSB or ECSS, requiring modification.

The R-392 is a different breed of cats. It is a compact, mobile unit requiring 28 VDC current to operate. It is immersion-proof and claimed to function under water or in a large dry martini. Triple conversion superhet on the eight lower bands, dual conversion above. It has 25 tubes. IF frequencies are: 1st IF variable 9/10 MHz, 2nd IF variable 2.5/20 MHz on MW band, and 3/2 MHz on all others. 3rd IF is 455 kHz, fixed. Odometer display to 1 kHz.

Selectivity choice is 8, 4 and 2 kHz bandwidths. Sensitivity rated as 9μV on MW, 7μV on 1-2 MHz and 5μV up to 32 MHz. No gap coverage is 0.5 to 32 MHz in 1 MHz steps with a 500 kHz band covering 0.5 to 1.0 MHz MW. The receiver is too hot in the front end for MW DXing except with an unamplified box loop. A very fine rig but not as popular as those with build-in power supply, hence it can be purchased frequently for under $200.00 There are a number of outboard combination speaker and power supplies available. Size and weight is smaller and lighter than any of the above.

The R1735/FRR/320 is quite different from the other receivers, having permiability tuning and twin oscillators. It was designed for aircraft and is an excellent receiver. It, too, requires 28 VDC current and an outboard speaker. It covers 1.8 to 18 MHz omitting the MW and SW above 16 meters. The rig is reputed to be very selective and exceptionally accurate and sells for under $150.00.

AN/GRR-5 is another smaller unit operating on 28 VDX. It is available now from Electronictown, 1622 S. Main St., Wilkes Barre, PA 18702 for $39.95 complete with a PP-308 combination speaker and power supply plus UPS shipping (around $25 to the west coast). This PP-308 may be adequate for the 392 or 1735. Dimensions are 13½ x 8¼ x 12½ inches for both units stacked. It covers (no-gap) 1.5 to 18 MHz (no MW or 13 or 11 meter SW) in four bands. Sensitivity is rated as 5μV on AM and 2μV on CW. Selectivity rated as 6.5 kHz at 6dB down (about equal to a FRG-7. CW filter not specified nor if it can be used in the AM.) Has crystal calibrator and provisions for presetting 10 frequencies. IF is 455 kHz. Will operate on 6, 12 or 24 VDC or the power supply ~~suppied~~. Rugged construction.

It's recommended that you purchase a service manual with the set which is an additional $7.50. You'll also need a special AC plug available for $3.50.

List of suppliers: Fair Radio Sales, 1016 E. Eureka St., Lima, OH 45802; Bill Slep, P.O. Box 100, Otto, NC 28763; Dames Communications Systems, 10 Schuyler Ave., North Arlington, NJ 07032; Charles Taylor, 936 N. Temple Ave., Indianapolis, IN 46201; John Kolb, 540 S. Kalbaugh, Ramona, CA 92065 (714/789-6015); Robert Herbig, 4178 Chasin St., Oceanside, CA 92050 (714/724-6773).

Evaluations of Receivers found in the Used Market: This month I will discuss three well-known brands: Heathkit, Kenwood and Drake.

Most Heathkit receivers are assembled from kits by hobbyists, but the majority of the receivers are well made as Heath maintains service stations to assist and correct. This service is available to a purchaser as well. The Heathkit Model SB-313 is a professional-looking receiver which has been very popular because of the tremendous savings in purchasing it in kit form. It is solid state, dual conversion with A-1 circuitry using 19 transistors, four of which are MOS FETs and 11 oscillator crystals and one integrated circuit.

Coverage is from 3.5 to 21.8 MHz in nine bands of 500 kHz each (11 meter, SW and CB bands lacking). Sensitivity is rated at less than 0.5µV for 10dB S+N/N SSB. Selectivity is 5 kHz at 6dB down, but the sharper SSB filter can be used in the AM mode with a simple modification.

An RF attenuator handles overload. Image rejection is rated at 60dB or better. Bandspread dial reads to 1 kHz, and with the built-in crystal calibrator the rig is electrically accurate to 500 Hz. The RF gain control has a pull-out switch to disable the speaker, allowing 'phones to remain connected.

Modes are AM, USB, LSB and CW. Other controls include Preselector, AGC (off, fast and slow), zero set dial adjustment and main double tuning knob controlling MHz and kHz scales in two windows. Audio power is a big 4 watts for an outboard 8 ohm speaker. Stable and accurate tuning is assured with a factory preassembled and prealigned LMO (Linear Master Oscillator). The bottom line is that this is a very good receiver for the usual used price of about $200.00. Credit is given to Bart Beal's article in "Tips and Topics" that appeared in SPEEDX.

Up to the advent of the new Kenwood-Trio R-1000, this line has been considered exclusively Ham gear. However, the R-300, which has sold new for as low as #239.00, is furnished with either Ham band frequency readout or SW.

It is the usual dual conversion (above 18 MHz) superhet with a full assortment of controls. It covers 170 kHz to 30 MHz in six bands: 170-410 LW, 525-1250 MW and no-gap 4 bands of 1.25-3.0, 3.0-7.5, 7.5-18 and 18-30 MHz. Sensitivity is rated at better than 1.5μV on all AM bands. Selectivity is held to 2.5 kHz with a poor shape factor. Panel controls, other than the tuning system (double drums) and the "S" meter, are Audio Gain, RF Gain, Antenna Trim, Band Selector and buttons controlling Mute, Xtal Cal., AM, BFO, CW, Tone, Selectivity and 'phone and recorder jacks. Audio output is 1.5 watts with 8 ohms load. Power required is 115 VAC 60 Hz or 12 VDC with batteries. Dimensions are 14"W x 7"H x 13"D. Weight is about 17 lbs.

I have been unable to rap with anyone having worked this receiver, but from the specs (with the exception of the poor shape factor of the IF filter in the AM) it would seem to have all the requisites of a good receiver for $150.00, used. If the R-300 you find has the Hand band drums, first check with Kenwood to see if the SW replacement drums are available.

The R.L. Drake Company and Collins have been the USA leaders in fine shortwave gear for years. Other manufacturers (such as Hammarlund and Hallicrafters) of good equipment have left the field for reasons hard to understand. They both produced excellent receivers and many are still favorites with experienced DXers. I remember Hammarlund as far back as 1924 when I was their manufacturer's agent on the west coast. They manufactured only variable condensers then, and they were the best.

Collins has dedicated its attention largely to Ham gear, and the few SW receivers they have built are very expensive, professional-type machines. Drake has given more attention to shortwave hobbyists, and in the past few years has produced a number of fine receivers starting with the 2-C, essentially a Ham rig which allowed coverage of the SW bands by use of an accessory crystal. It sold for $255.00 and although its design was orthodox, it was well-designed and its ability as a good SW machine was enhanced with the use of crystal lattice filters. It had an RF gain control and a bandwidth choice of 400 Hz, 2.4 and 4.8 kHz. It was an excellent beginner's rig. It is found in the used market for about $150.00.

Drake then introduced the SW4-A which was the first receiver actually designed for SWL. It was a vacuum tube set, as was the 2- , covering 150-500 kHz LW, 500-1500 kHz MW, plus 49, 41, 31, 25, 19, 16, 13 and the 11 meter CB band. It was basically the same as the later R-4 series but with fewer embellishments and capabilities. It had an accurate analog frequency readout, crystal lattice IF filtration, true "S" meter, etc. It sold for $295.00. About this same time, Drake released the first of its R-4 series. It was a sophisticated rig for its time and was sold with crystals for Ham use but with extra spaces for SW crystals, making it equally satisfactory for either spectrum. It also sold for $295.00. Then started improvements of the R-4. The R4-A had improved IF filters; the R4-B was further improved. It had 10 extra spaces for SW crystals. The R4 series used both vacuum tubes and solid state. Drake stuck to its contention that tubes were still superior to transistors in certain functions. The R-4 series was suprior because of the passband tuning and ability to use all installed IF filters in any mode. The R4-B is concered to this day by many of our finest hobbyists to have been Drake's best accomplishment. It has four bandwidths: 400 kHz, 1.2, 2.4 and 4.8 kHz, switchable to all modes. It had an effective notch filter and an antenna tuner plus the pass band circuitry giving it an ability for DXing superior to anything available up to that time.

These sets are hard to find in the used market as most owners don't care to sell them. A good R4-B will bring as much as an SPR-4: $400.00 to $450.00.

The R4-C then followed which Drake produced as an improved R4-B. It should have been given a different model number as it was quite different than the other R4s. It still had the pass band tuning, but the filter arrangement was changed allowing only 2 filters for each mode. One change was good: better shielding eliminated radiation interference to nearby TV sets, a bad habit of its younger brothers. Only a few of the gang consider the R4-C to be an improvement over the R4B. Nevertheless, it is a superior receiver, frequently bringing $50.00 more in a used market than the "B."

Drake brought out their *Piece de Résistance*, the SPR-4. This was a brainchild of the engineering department and was offered as the best there was short of the Drake professional model DSR-1 with its early (to the hobby) phase locked, digital readout frequency synthesizer. Only a signal causes it to break silence, and it cost an arm and a leg. The SPR-4 was truly a fine receiver. The frequency was read accurately (analog) to 1 kHz. It was both sensitive and selective but had lousy audio. It was all solid state, but foolishly (as thought by many) Drake substituted dual conversion superhet for the passband tuning of the R-4 series. (Note that Drake has returned to pass band in the new R-7/DR-7). Nevertheless, the SPR-4 is today considered the best at any price. It sold for about $500.00 and is now priced by Drake at $699.99 (new). It is about $450 in the used market for a mint unit.

I have almost forgotten Drake's illegitimate child: the SSR-1. This rig (a solid state job) just is not "Drake." It is rumored to have been built in Japan for Drake. Although this is no reason to condemn it, its lack of resemblence to its brothers and sisters, its unspectacular performance and its poor acceptance in hobbyville, makes it sort of an orphan. It sold for $350.00. I see it listed as low as $200 in the magazines. I understand Drake has found a good market for it in Europe.

The bottom line is: All Drake receivers are good merchandise. They are honest receivers, and the factory is unusually cheerful about putting even an old model back into "good-as-new" condition. If you have a choice, pick the R4-B. One at $350.00 is an honest value.

More on Surplus Military Radio Equipment: Many fine and sophisticated receivers exist in the surplus market. However, this equipment is highly specialized and what may appear to be a desirable receiver can be useless to the SWL. Its frequency coverage may be only for a narrow band in a special field of communications used only by the military. Another problem is that the unit may be part of a set of units dependant upon each other to perform a special function. Again, we find many instruments incomplete in that they require outboard power of odd voltages and types. Unless one is familiar with military equipment, it is dangerous to purchase from dealers in general surplus gear. There are, however, dealers that specialize in surplus radio equipment for Hams and SWLs. Also, they supply modifications such as solid state power sources, modern components, etc.

You should write for Fair Radio Sales' catalog (1016 E. Eureka St., Lima, OH 45802. Telephone: 419/227-6573). Another good catalog and information is available from Electronictown, 16622 S. Main St., Wilkes Barre, PA 18702.

The attraction of surplus gear is one's ability to purchase for peanuts equipment that has cost the military thousands of dollars. Drawbacks, outside of the multiplicity of models, are that most equipment use vacuum tubes, some of which have become obsolete and certain components that deteriorate with age. Other units have complicated gearing which, when worn, can be annoying. Most military receivers are very strongly built and, consequently, heavy. Hobbyists call them "boat anchors." With all of these drawbacks, many of our top-notch SWL and DXers swear by surplus equipment. The most popular models include the R388/URR, R390/URR, R390A/URR, R392/URR, R648/ARR41 and the R1735/URR-FFR-230. Units which have been kept in good order, or which have been put in good order, sell for from $200 to $450. Many models were built by Collins, but other manufacturers produced identical receivers under government contract.

Several specialists in surplus military gear have already been mentioned, but another is Bob Ehlers, 1125 Alexandria, San Diego, CA 92107 (714/222-9446). Bob is not a dealer nor repairman but knows his military gear and is willing to advise.

P.S. Discovered local surplus outlet: Electronictown, Inc., 440 7th Ave., San Diego, CA 92112 (714/232-9379). Best buy: Hallicrafters Military R-274-FRR. No-gap 540 kHz to 54 MHz in 6 bands for $225.

I telephoned Grant Manning regarding this receiver and learned that it is a classic and one of the finest receivers to be found in surplus. He will furnish specifications if 'phoned at 714/741-2891 and, for a fee, will check it out thoroughly, replacing weak tubes or other components if required and feasible. Electronictown will sell with a money-back guarantee allowing a reasonable time for testing and trial.

List of Receivers Appropriate for Short Wave Listening prepared with the assistance of Ralph Sanserino. Many of these receivers were designed for Ham use but are quite satisfactory for shortwave listening.

Where the bandspread dial covers Ham frequencies, operate as done when tuning the DX-150. In some cases, where a slide rule type of bandwidth frequency display is used, a new scale can be lettered for the SW bands. Many of the receivers are no longer manufactured and are found only in the used market. In most cases, parts are still available from specialists.

Prices vary according to condition, urgency of the sale, installed modifications or whether the offer is made by a dealer or a private hobbyist. If the asking price is quite different from this list, look for a reason. It is wise to insist upon a full refund if an overnight trial proves unsatisfactory to you. Get it in writing. If you wish to be extra sure, take the rig to a technician and pay for a check out. It is possible some receivers were forgotten when this list was made.

The following abbreviations are used:
* = New and/or not yet available
V = Approximate used value
L = Present List Price
D = Discount Price available
N = Original List Price

Allied (Radio Shack)

SX-190	250N	150V
AX-190mod	250N	140V

Collins

51S1		1200V
651S1		400V
51J3		225V
51J4		375V

Drake

2B		180V
2C		160V
DSR-1		1195V
DSR-2	3200L	2495V
R4		250V
F4A		285V
F4B		350V
R4C		450V
SPR-4	700L	450V
SW4-A		200V
R-7/DR-7	1139D	

Galaxy (High Gain)

R-530	795N	400V
R-1530	700D	475V

Hallicrafters

SX-100	295N	130V
SX-110	460N	150V
SX-112	595N	175V
SX-122	295N	195V
SX-122A	395N	300V
SX-130	180N	125V
SX-113	250N	175V

Hammarlund

HQ-100	170N	100V
HQ-100A		150V

Hammarlund Continued

HQ-129X	177N	70V
HQ-140X	265N	100V
HQ-140XA	250N	90V
HQ-145	270N	140V
HQ-145A		150V
HQ-145C	279N	150V
HQ-145X		150V
HQ-150	294N	100V
HQ-160		160V
HQ-180		245V
HQ-180A		300V
HQ-200	250N	150V
HQ-215		200V
PRO-310	495N	275V
SP-400X	342N	200V
SP-400SX	400N	250V
SP-600IX		180V

Heath (Homebrewed)

SB-310	260N	180V
SB-313		250V

Hitachi

KH-3800*	500 to 600L

Japan Radio Company

NRD-505		2275L

Trio Kenwood

QR-666		180V
R-300		190V
R-1000		See Note

Lafayette

HA600A	100N
HA600T	100N
BCR-101	250N

McKay Dymek

DR-22	995L
DR-33	1500L
DR-55	800L
DR-101	1150L

National

NC-109	200N	
NC-190		150V
NC-183D	370N	
NC-140	190N	
NC-240C	250N	
NC-240D	225N	
NC-240GS	250N	
NC-400	895N	
HRO-60	795N	200V
HRO-500	1295N	
HRO-600	3000D	

Panasonic

RF-4800	385D
RF-4900	400D

Racal

RA-17 & I17		800V
RA-617		
RA-6217		1000V
RA-6772	6000L	

Sanyo

RP-8880	300L	200V

Sony

ICF-6700W	350L	200V

Tech Material

GPR-90	395N
GPR-91	
GPR-92	1552N

Yaesu Musen

FR-101		
FR-101 Digital		470V
FR-101S	600L	360V
FRG-7	340D	275V
FRG-7000	600D	450V

PORTABLES

Barlow Wadley

DCR-30	240D

Grundig

Sat 2100	580D
Sat 3000	995D

Heath

GR-78	130N

Nordmende

Galaxy 9000	495N
Globe Trotter	450D

McKay Dymek DR-11 150L

Panasonic

RF-2200	123D
RF-2900	219D
RD-2600	200D

Sony

CRF-320	1139D
ICF-5900W	130D

SURPLUS & MILITARY

R388/URR		350V
R390/URR		350V
R390A/URR		450V
R392/URR		200V
R648/ARR41		200V
R1735/FFR/230	750N	150V

Note: Special price to Club Members *only* from Jim Rafferty, HAM RADIO OUTLET, Anaheim. Toll-free 800/854-6046 for prices on Kenwood.

Realistic Radio Shack

DX-150 A&B	120N	85V
DX-300	380L	325V
DX-160	180L	125V
DX-60 portable	70L	

Hallicrafters SX-110: I was fortunate enough to obtain one of these fine receivers at a bargain. It is a revealation to learn how very fine some of these old rigs are. Unfortunately, many of the better models were manufactured for Ham use, and the dial and bandspread scales are for the Han bands only. This means you either use the 0-100 scale (as with a DX-160), make a new scale or install a digital readout. In some cases the DRO will cost triple what you paid for the receiver. On some receivers, like the Hammarlund, the bandspread scales are difficult to rescale and renumber. The Hallicrafters' slide-rule analog readout is more easily changed. However, for a person unable, or unwilling, to shell out $400-500 for a receiver, the inconvenience of chart tuning (as with the DX-160) can be overlooked.

The signals are there, just like on the expensive new rigs, but the logging is more complicated. A newcomer to SWLing can take advantage of the lower cost of these fine old receivers but should seek the assistance of an experienced SWLer in making his selection. Some of the older models are inappropriate for SWLing. For those living in the San Diego area, listening to the Otay repeater net at 8:00 P.M. every Sunday night will reveal receivers offered for sale during the roll call. The Swap Meet at the Santee Drive-In is also a source for used gear, but take an experienced SWLer with you. (First Saturday of each month. Starts at 7:00 A.M.)

Panasonic RF-9000: Ralph Sanserino sent me a Xerox of an ad for the new receiver from which I am able to extract a general idea of what we have. Unfortunately, it does not supply all of the answers. The big mystery is the weight of the unit: 50 lbs., 11 oz. It is 20½'W x 14½'H x 8'D. That's enormous!

Panasonic calls it an "All-Band Microcomputer Programmable Communications Receiver." It has 15 station preset tuning and digitalaccess tuning (FM, SW, LW, MW - AC/DC). Features are listed as: Quartz Synthesized FM, MW, LW and SW to 30 MHz; Direct Access Tuning; LCD Quartz Clock (time, month, date and day with 7 day programmable timer); 15 Station Preset Tuning (with memory); Automatic Electronic Band Selector; Digital Frequency Display on all bands;

battery for clock and memory bank; Direct Touch Tuning; 3 AM Bandwidths (wide/medium/narrow); LSB and USB operation; AM Frequency Step Selector (100 and 1000 Hz); Tuning Meter (battery check and FM center tune meter); Separate bass and treble controls; RF Gain; Dual Speakers (5"x7" oval and a 2½" tweeter with an on/off switch); ANL circuitry; Tuning speed selector; 30 LED Frequency Indicator; Dual Telescope Antennas; 115 VAC 60 Hz and 12/18 VDC battery power with 3 VDC cells for clock and memory.

Receiver type given as Quartz Synthesized Double Superheterodyne with Microcomputer. The things I don't exactly understand are: Direct Access Tuning, Direct Touch Tuning and 15 Station Preset Tuning, the widths in kHz of the bandwidths, the "30 LED" frequency item and, of course (and for God's sake), the price.

The receiver, as pictured, shows a portable shape: wide, tall, but only 8" deep. There are only three controls: a large tuning knob and two small knobs (volume and RF Gain). At the top of the panel is the clock, the frequency readout to 108 MHz and the two meters. Immediately below is a full width slide-rule scale of the MHz coverage with 22 "Touch Tuning" buttons. A wider panel contains 54 microcomputer controls in six groups of buttons and, lastly, two slide switch tone controls.

The quality of the Xerox copy doesn't allow me to read the button functions, but I am sure everything is there including a change for the baby. The upright shape of the 9000 permits better arrangement of the innards. Long leads from the computer chips to the panel buttons would be required in a conventional design. The weight is still a big mystery. I am holding my breath for the price. It's gotta be more than I can afford.

More on the Panasonic RF-9000: The RF-9000, introduced in Bulletin 22, can now be properly described. Member Stephen Sluka kindly sent me a copy of a factory newsletter covering the new receiver.

My description was correct and we can now answer my questions. First, let me say that Panasonic has apparently attempted to manufacture a receiver which takes advantage of all of the latest techniques in both radio receivers and microcomputers. Karl Tetzner of "Funkschon" in Germany calls it the "Monster," and righfully so as it weighs 50 lbs. 11 oz. (Net without batteries: 44.9 lbs.) Delivery will be this autumn, and the US price is expected to be $3,800.00. The Matsushita Newsletter is six pages and I will send a Xerox for a $1 and a SASE (legal size).

Now to answer the questions I asked in the March description: Direct Access Tuning refers to pushbutton entry of a frequency on the digital display. This pinpoint tuning is automatically done by the PLL synthesizer. The Direct Touch Tuning refers to pushbutton choice of one of the 22 frequency zones (bandwidths). This is used in conjunction with Manual Tuning which is a slow/fast photoelectric-type rotary system unique to this receiver where a special optimization control in which the transfer function of a PLL loop filter is automatically selected according to each receiving band or mode. This complicated function is made possible by a microcomputer-aided electronic circuit. The 15 Station Preset Tuning is a Memory Storage of 15 frequencies which can be scanned for 1.5 seconds each. The bandwidths (or selectivity) choices are: WIDE 4.8 kHz at -6dB and 10 kHz at -60dB (shape 2-1); MEDIUM 3.2 kHz at -6dB and 6.4 kHz at -60dB (shape 2-1); and NARROW 2.4 kHz at -6dB and 4.6 kHz at -60dB (shape 1.9-1). The "30 LED" item refers to the display which indicates many functions other than frequencies such as "GMT Time" and "Preset Schedules" which can be set for daily, once a week, everyday, but one, everyday but two and twice a week. The clock displays hour/minute/second/day or month/date/day. The "for God's sake" price is $3,800.00.

Technological innovations not covered in my original description include the double conversation superheterodyne with the PLL synthesizer plus the loop filter circuit which realizes quick transient response by automatically selecting the correct transfer function making possible:

1. High resolution into 299,550 channels permitting tuning in 100 Hz steps for LW/MW/SW and 10 kHz steps in FM.
2. High carrier/noise ratio of better than 60dB.
3. Low transient noise of better than 60dB at the detector.

The RF-9000 gives every promise of being a very special professional tool for SWL and DXing.

Report on the RF-4900 Modification by Donald Minor, WDX7DM.

I know that there are many club members that are using the Panasonic RF-4900 receiver and would like to get a little more out of this very fine receiver.

I have found that the RF-4900 outperforms the REalistic DX-300, which I also have. The RF-4900 gives me far stronger and clearer signal even not modified. Since I want a little more out of this fine receiver, I went and had major surgery done. *Wow*, what results! The signals are much stronger and clearer. I was amazed at what was accomplished.

I was fortunate enough that I was able to purchase the Collins filter from John Kolb in Ramona, CA (for an arm and two legs). Hi. It was well worth the sacrifice though. I then took the receiver to my favorite country doctor and had him perform his miracle surgery. I must say that he did a superb job. I want to thank both Mr. Kolb and Udom Tangratanavallee (phew) for their excellent expertise.

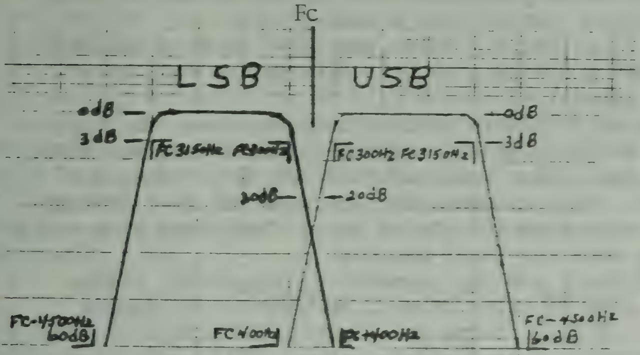
I have found that the only time I have had to do recalibration is in the 31 and 13 Meter Bands. In these bands, I am off 3 kHz. I will then pick a station on its known frequency (or tune in on WWV) to recalibrate. Since I am a little lazy at times, I often just tune in 3 kHz off and I am there listening to my favorite station.

With the filter being mechanical, this makes the SW2-8 Cal. button that much more sensitive, and you don't have to move it very much to be on frequency. I have found that there is no drifting and that the receiver stays on frequency.

I would like to pass on some of the particulars of the filter that was installed. They include:

	Limits	Nom. Values
Carrier Frequency (Fc)	455 or 500 kHz	---
Carrier Rejection	20dB min.	25dB
Frequency Response	See curves	
3dB bandwidth	2850 Hz min.	3100 Hz
60dB bandwidth	4900 Hz max.	4100 Hz
Passband ripple	2.5dB max.	1.5dB
Insertion loss	2.5dB max.	3dB

Source load impedence: 2000 ohms
Operating temperature range: -20 to +60°C
Shape factor: Nominal 60dB to 3dB is 1.3 to 1.

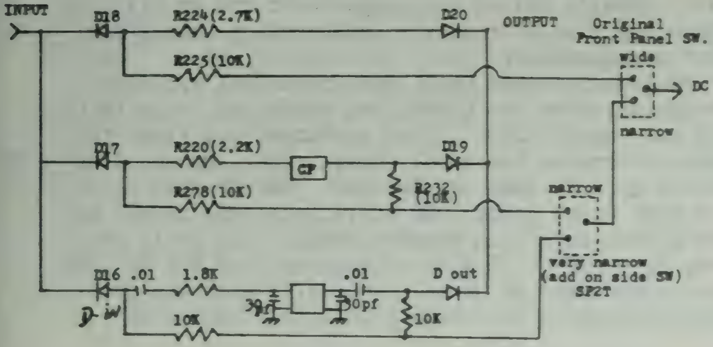


Frequency Response: Worst Case Limits

I must state here that as this is an SSB filter, you may not get the full value of the filter due to the design of the receiver. It will still do a great job as I stated before.

For those who have the RF-4900 and want to have it modified, I have included the schematic that was used.

Modification Schematic for the Panasonic RF-4900



The schematic on the previous page was courtesy of Udom Tangratanavalee of Hi Fi Sales, Mesa, AZ, and John Kolb, Ramona, CA.

I suggest that if you want more information on the Collins Filter, you should write to John Kolb, 540 S. Kalbaugh, Ramona, CA 92065. He will also do this major surgery for a nominal fee.

I hope that for those who might want to have their RF-4900 modified that this information will be of some benefit.

I would like to mention here for those who would like a nice pair of headphones that I just purchased from Radio West a set of Yaesu YH-55's. They are great. They are mono and designed for SW listening and outperform the stereo ones. Feel free to contact Radio West for their catalog.

If there are any comments or inquiries, please feel free to write to me. My address is: Donald Minor, 1148 E. Tempe Dr., Tempe, AZ 85281. If I cannot answer a particular question, I'll pass it on to those with the expertise. 73's and good DXing.

Panasonic Line: The WRTH-79 carries (on Pages 24 and 25) an advertisement for the Panasonic DR series of receivers. For some unknown reason these receivers are not available in the US. They are identical to the RF-2200 and the new RF-2900 except for an LW band in the DR units. They have been available for some time in Europe, Australia, etc.

Panasonic Portables (not RF-9000): Member Paul Kowalski has experienced Panasonic's poor quality control. Paul's dealer was sympathetic and on his side, replacing several recievers and sending others for factory adjustment.

Paul was plagued with inaccurate dial readings, images all over the place, bad drift and lousy MW on all but the RF-2200. After exchanges and trips to factory service for re-alignment, etc., he ended up with a good RF-2200 and RF-2900. The RF-2600 never did come up to specs. He still gets some images but can defeat them with a preselector. The drift goes away after 10 or 15 minutes warm-up, and his RF-2200 is a hum-dinger on MW DX, especially with the gyro antenna working in conjunction with either a RW

"Shotgun" or a Select-A-Tenna, nulling interference and boosting signal strength simultaneously. Paul has made a chart comparing the RF-2200, RF-2600 and RF-2900, assuming all three sets to be in proper condition. I have had to do a bit of editing to fit the available space. I would like to interject here the importance of your dealer. He can either sell you a rig, ring it up on the register, then fail to recognize you when you return with problems, or he can see that you are staisfied or he will refund your money. A *very good* dealer is one that will not deliver equipment until it has been tested and adjusted on instruments in his shop. We are fortunate in having a dealer like that here in San Diego; Radio West insists that you get only a tested and adjusted receiver or equipment.

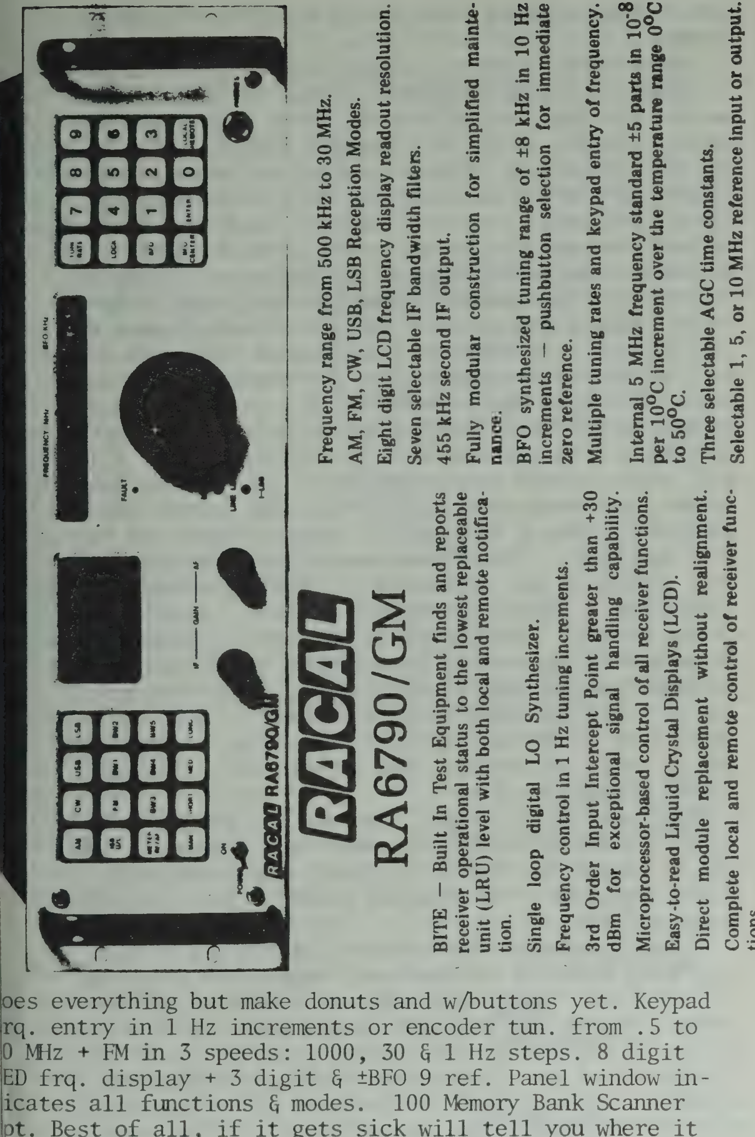
	RF-2200	RF-2600	RF-2900
Frequency Readout	Analog	Digital	Digital
Shortwave Dxing	VG. Sensitive on whip alone	Poorest of the 3 sets	Not as good as 2200 on whip but best on outside antenna.
Shortwave Images	Many but most out of band. Preselector helps	Best rejection	Some but most out of band. Defeatable w/ preselector.
Readout Crowding	No problem	Not bad	Analog bad. Band 3 cramped.
Selectivity (Narrow)	Not so hot. Biggies cover 15-20 kHz.	Better. Cover 5-10 kHz	Same as 2600. Requires sharper filter mod for opt. recept.
SW Birdies	Only very few	Quite a few. See 2900 remedy.	Same as 2600 but defeatable by setting dial below freq. & correcting w/calibrator

	RF-2200	RF-2600	RF-2900
MW Dxing	Excellent. Best of 3 in specs & actuality.	Terrible	Not as good as 2200 w/ whip but excellent w/ "Shotgun" or outside ant.
MW Birdies	None	Few	Fewer
FM Mode	Good	Good	Best for DX
Calibration	AM Poor FM Poor SW 5 kHz	AM Good FM Good SW 1 kHz	AM Good FM Good SW to 1 kHz
SSB	Good	Easy to tune but poor audio.	Same as 2600.
Audio	Good	Poor Quality	Big Sound Dandy
Opinion	Best Buy Best MW	Didn't like it.	Best for SW & as backup.

Further remarks: RF-2200 SW has poor analog readout. Gyro antenna big plus. Easy on batteries. RF-2600 is inferior to RF-2200. No oomph. Funny looking. Digital readout only plus. RF-2900 needs the boost of a "Shotgun" or Select-A-Tenna as well as modification of 2.9 kHz IF filter and an outside or active antenna to bring it up to the performance of the "better" receivers. The best under $400.

Redifon R-1001: British-made professional type synthesized communications receiver. A quite expensive, highly sophisticated tuner with scanning ability of preprogrammed channels with remote control capability.

Features: Coverage 15 kHz to 30 MHz in 10 Hz steps with single tuning control with variable speed and a lock. Wraparound tuning at ends of each frequency band. Digital display of frequency down to 10 Hz. Nineteen preprogrammable operational channels which can be scanned. Electronically controlled tuning speed. Optimum sensitivity, stability and reliability. Outstanding reception virtually unaffected by strong


RACAL RA6790/GM
POWER
ON
AM
CW
USB
LSB
BW1
BW2
BW3
BW4
BW5
SHORT
MED
LONG
IF
GAIN
AF
FAULT
FREQUENCY MHz
BFO kHz
LOCK
BFO
ENTER
7
8
9
4
5
6
1
2
3
0

RACAL

RA6790/GM

BITE — Built In Test Equipment finds and reports receiver operational status to the lowest replaceable unit (LRU) level with both local and remote notification.

Single loop digital LO Synthesizer.

Frequency control in 1 Hz tuning increments.

3rd Order Input Intercept Point greater than +30 dBm for exceptional signal handling capability.

Microprocessor-based control of all receiver functions.

Easy-to-read Liquid Crystal Displays (LCD).

Direct module replacement without realignment.

Complete local and remote control of receiver functions.

Frequency range from 500 kHz to 30 MHz.

AM, FM, CW, USB, LSB Reception Modes.

Eight digit LCD frequency display readout resolution.

Seven selectable IF bandwidth filters.

455 kHz second IF output.

Fully modular construction for simplified maintenance.

BFO synthesized tuning range of ±8 kHz in 10 Hz increments — pushbutton selection for immediate zero reference.

Multiple tuning rates and keypad entry of frequency.

Internal 5 MHz frequency standard ±5 parts in 10^{8} per 10^{0}C increment over the temperature range 0^{0}C to 50^{0}C.

Three selectable AGC time constants.

Selectable 1, 5, or 10 MHz reference input or output.

oes everything but make donuts and w/buttons yet. Keypad
rq. entry in 1 Hz increments or encoder tun. from .5 to
0 MHz + FM in 3 speeds: 1000, 30 & 1 Hz steps. 8 digit
ED frq. display + 3 digit & ±BFO 9 ref. Panel window in-
icates all functions & modes. 100 Memory Bank Scanner
pt. Best of all, if it gets sick will tell you where it
urts. SASE-10 & 5 18¢ stamps will get you Xerox specs.

interfering signals or adjacent high power transmissions.

Front panel features: Meter with 8 position switch to indicate Signal Strength, Tuning indicator, Line output and internal voltages. Seven figure LED frequency display to 10 Hz. Channel Display with 2 figure LED indicator. Channel selection buttons: one advances by 1's and the other by 10's. Illuminated "Store In" button enters frequency, mode and bandwidth into chosen memory channel. (To avoid accidental engagement, the button must be pushed twice.) Store "Out" button activates stored frequency and locks receiver tuning and cancels inadvertent engagement of "In" button. Illuminated Scan button activates scanning of stored frequencies in the memory bank. Has adjustable scan dwell period of 0.1 and 15 seconds. Stanby/On button. Five Bandwidth selectivity buttons injecting IF filters of 0.3, 1.0, 3.0, 6.0 and 8.0 kHz (6 kHz filter is optional). Switch controlling speaker and earphones. Separate Audio and RF Gain controls. Tuning Knob with 3 buttons above for Slow, Fast and Lock. "Slow" electronically sets tuning rate to 600 Hz per revolution. "Fast" increases it to 600 kHz. "Lock" disengages control. Display/Receiver switch. Display position permits channel information to be entered into memory and displays contents of the bank on the readout. Receiver position displays receiver operation status. BFO pitch control of ±3 kHz and a "fixed" position for optional FSK or Telex operation. AGC switch, off, slow and flast. Earphone jack.

Rear panel facilities: Antenna and ground terminals. 1.4 MHz IF Output, Systems Input/Output. 1.4 kHz IF output for ISB only. Audio inputs/outputs. 1 MHz reference from external source. Power supply input and fuse.

Specifications: Performance figures apply to broadband input of 50 ohms and temperature range of -15 to +55C. Range is 15 kHz to 30 MHZ in 10 Hz steps. Tuning and Readout: Single knob tuning at 600 Hz or 600 kHz per revolution. Seven figure LED display to 10 Hz. Wraparound coverage beyond ends of bands. Memory Bank: 20 channels store frequency, mode and bandwidth; one channel reserved for power off conditions (00). Either of two groups of channels can be scanned with adjustable dwell of 0.1 and 15 seconds. Frequency stability: within ±5 parts in 10^8. Short term within ±3 Hz peak deviation. Long term within 1 part in 10^6 in one year. Modes: CW, AM, USB, LSB and ISB. BFO with ±3 pitch control and FSK setting fixed at 1700 Hz (1500 Hz optional). Sensitivity: Signal-to-noise ratio is better than 10dB on 3 kHz bandwidth. Sensitivity rated only for CW and SSB and varies from 7.9μV e.m.f. to 0.7μV e.m.f. from 15 kHz to 30 MHz. Antenna Input: 50 ohms unbalanced wideband. Cross Modulation: An interfering 30% modulated signal at least 20 kHz from a wanted signal of 300μV e.m.f. must be greater than 300mV e.m.f. to cause 3% cross modulation. Blocking: An unwanted signal of 1μV e.m.f. 20 kHz removed from a wanted signal of 1mV e.m.f. will reduce the output by less than 3dB. IF Output: 100mV ±1dB into 50 ohms at 1.4 MHz with AGC on. IF and Image Rejection: IF rejection (38 and 1.4 MHz) and 1st and 2nd conversion image rejection better than 80dB. AF Output: 2 watts to outboard 3 ohm speaker. Internal speaker 1.5 watts. Power: 100-125 and 200-250 VAC 45-65 Hz. External adaptor for 24 VDC. load is 85mA on AC and 3.5A on 24 VDC. Dimensions: 7 x 19 x 19½ inches HWD; weight: 42 lbs. (Note; Refer to comments concerning "advances by 1's and 10's. This may be incorrect being my own interpretation of the meager data supplied.)

Reliability is an important feature of the R-1000 series. It is achieved by the elimination of all mechanical linkages and by the use of only the highest quality components and proven LSI/MOS packages. If a failure does occur, location of the fault and repair time can be kept to a minimum. The front panel frequency display flashes if the synthesizer is "out-of-sync" and a self-diagnostic system in the synthesizer (using LEDs on each synthesizer loop) allows rapid location of faulty module. The front panel meter monitors circuit conditions. All printed circuit boards plug-in and can be replaced rapidly without electrical adjustment. The front panel hinges down for easy access to tuning and display circuits.

The Model R-1001 is one of 8 receivers being designed as a General Purpose local controlled Communications Receiver. Model R-1000 is the Marine Version, R-1002 the Step Synthesis model, R-1003 Military Mobile, R-1004 Naval model, R-1005 Monitoring Receiver with Visual Tuning aid, R-1006 for both local and remote control and R-1007 for remote control only.

It must be obvious to the reader that we have an expensive and highly-sophisticated versatile rig here. Two letters to the manufacturer in England have failed to discover the price, but I am sure it will be beyond my capabilities. Before I get an uncontrollable urge, I am going to investigate an American-made receiver manufactured by Rhode & Schwarz in New Jersey. Grant Manning says their Model HF-1030 has abilities beyond our fondest hopes. Maybe if I raised the SDDXC subscription rate again and applied for a grant from Congress, I could purchase both of them.

Redifon R-1001: Described in Bulletin 24 and feared to be very expensive. That was not the right word. A note from member Steve Sluka puts the price at about 6,000 British Pounds (over $12,000.00 US). The USA representative is Redifon Simulations, Inc., 210 Summit Ave., Montvale, NJ 07645. Attention Mrs. M. Hobe. It is odd to note that Montvale, NJ is also the location of the burned-out factory of the Rhode Schwarz receiver mentioned in Bulletin 25, Page 5 and Bulletin 26, Page 16. In this connection, I have just learned that production of the HF-1030 is not expected to resume (after the fire) until an updated model (still on the drawing boards) is ready for production which is possibly next year.

Rhode & Schwarz HF-1030: According to Grant Manning of Radio West, this firm manufactures equipment that can be classified as "Professional" and is very expensive. As everything is becoming "very expensive" and we may be approaching the time when money will not represent wealth as much as desirable possessions, I decided to investigate. When my letter of inquiry wasn't answered, I mentioned it to Grant only to learn that the factory had just burned to the ground. I just saved myself about six grand.

Rhode & Schwarz Professional RX mentioned several months back was manufactured by Communications Product Corp. of New Jersey and production stopped with destruction of the factory by fire. Arrangements have now been made for the manufacture of an updated version of the HF-1030 to be done by Cubic Communications, Inc., 305 Airport Rd., Oceanside, CA 92054 (714/757-7525). Delivery is planned for June/July 1981. Tentative price is $6,500.00. The updated receiver will include RF derived 3-time constant AGC. Available bandwidths: 15 kHz to 400 Hz. Front panel selection of bandwidths, modes and AGC time constant. Oven controlled frequency standard. Synthesizer switching speed reduced to 30ms. Guaranteed 26dBm.

Evaluation of Current Portables that have been on the Market some time: The most popular are SONY ICF-5900W, Panasonic RF-2200 and 2900 and the Barlow Wadley XCR-30. Japanese-made Sony and Panasonic are handled by the New York discount houses and can be purchased for as much as 40% off list. The approximate prices as quoted by 47th Street Photo, Foto Electric Supply and Portney's in New York are: ICF-5900W - $119.50; RF-2200 - $112.00; RF-2900 - $178.00. The Barlow Wadley is discounted to $239.50 by Radios International of Richardson, TX.

The Sony and the Panasonics are dual conversion superhets. The Barlow Wadley is the so-called Wadley Loop (Phase Locked Loop). The only receiver with digital readout is the RF-2900. A new RF-2600 updates the 2200 with digital readout and other improvements, but as it is new will not be discussed with the portables found in the used market. Actually, the RF-2900 is a lot of receiver for $178.50, and with improved selectivity modifications, is just about tops in the portable category. Grundig and Nordmende are certainly more sophisticated but the only thing portable about them is the handle, and they sell for several times the cost of the smaller receivers.

All of these four receivers suffer from image problems, and the XCR-30 is the only one that can't be helped by attenuation. The early XCR-30s (Barlow Wadley comes from South Africa) were apparently assembled by raw savages out of the bush as they looked like the components had been thrown into a box and stirred with a stick. Avoid these as there have been problems. So many came back that Mssrs. Barlow & Wadley instituted a product control and modern assembly line, and the caught on and became the best available in small portables.

Following are specifications and information regarding the four portables, repeating my own previous observations and those of other reports in SWL club bulletins:

Sony ICF-5900W (credit goes to Larry Magne's article in FRENDX March 1977 plus my own observations). An ingenious linear readout (analog) portable at the affordable price of $150. Novel variations of a conventional design and use of the FM 10.7 MHz IF as the first SW filter, enables Sony to price the receiver at about half the price of the competitive XCR-30. An identical receiver (the ICF-5900) is sold in Japan but covers only Japanese FM. The "W" indicates FM coverage of US frequencies. The set is lightweight, compact and modish in appearance. It operates off 3 "D" batteries or house current. Analog frequency on FM and MW is direct and a bit tight on the MW. However, the SW display is linear bandspread with accuracy of ±5 kHz, depending upon the set and operator. There is a built-in ferrite rod antenna for AM and a telescope whip for both FM and SW. Terminals for an outside antenna are on the rear panel. Tuning is preceeded by calibration, activating a control switching in a crystal calibrator, the BFO and disconnecting the antenna. SW reception is good, and sensitivity and selectivity are almost equal to the XCR-30. The audio is the usual Japanese-accentuated bass. Unfortunately the set cannot reach the 90 and 120 meter bands, and the 10.0 to 11.6 MHz gap leaves out a number of oriental broadcasters. The ICF-5900W has several advantages over the Barlow Wadley in that any front-end overloading can be reduced by attenuation. The XCR's 1 MHz "pip" is absent, and powerful signals from 1 MHz away do not "break through" as on the Barlow Wadley. Also, smaller size and weight enhances its portability. Another plus is the FM band, obtainable only as an option on the XCR-30 and the superior MW performance. The ICF-5900W is free of images, and spurious signals are rarely heard. I owned one of these rigs and was happy with it, accepting small deficiencies for the advantage of true portability.

Panasonic RF-2200: This Panasonic portable was presented as a competitor to the ICF-5900W. The RF-2200 sells for $189.95 ($112.00 at NY discount houses).

The RF-2200 is a sold state dual conversion superhet 8 band portable. It tunes 3.46 to 28 MHz on 6 SW bands and both AM and FM. Sensitivity is claimed as 0.8µV to 2.0µV on the SW bands. Selectivity is 5 kHz on "wide" and 3.4 kHz on "narrow." It has a gyro directional ferrite loop antenna for AM and a telescoping whip for both FM and SW. There are terminals on the back for outside antennae. Has a tone control. Power is either inboard "D" cells or house current. Analog frequency readout has a 4 MHz spread with 10 kHz markers. Crystal calibrator marks are at both 125 and 500 kHz. Two speed tuning knob geared for smooth operation. Automatic FM mode AFC. Inboard 4" speaker and jack for auxiliary speaker. A battery-saving switch for dial lights. Odd arrangement of backward tuning and "S" meter: both increase to the left. Cabinet and panel are pseudo-military and attractive. A handle is furnished in the form of a web strap. Weight is only 7 lbs. 8 oz. Size is $7\frac{1}{2}$ x $12\frac{1}{2}$ x 3 inches.

Tuning controls well arranged, are well lit and a pleasure to work. The tone is the best of the four portables. Both FM and AM modes perform well. SW performance equals that of the ICF-5900W and overloading is not a problem. Selectivity for DXing is about equal to the other portables.

Some negative features: 90 meter band missing. The "SW" switch has some "cross-talk," and the ceramic selectivity filters have wide skirts which doesn't allow performance indicated by their good kHz ratings. The "S" meter pins on anything above a whisper. The rotary AM antenna is noisy in operation (clicks in signal).

In summary, the RF-2200 represents an excellent value for its price. Not discussed is an updated RF-2200, the RF-2600, which appears to be a considerable improvement but at an increased retail price. It has digital readout on all bands, an RF gain control and a BFO pitch.

The Panasonic RF-2900 is a jim-dandy with more poop and selectivity, equal to rigs costing a lot more. However, like most of the new crop, it requires modification for top notch DXing. Radio West specailizes in these selectivity modifications and should be consulted about a prospective purchase. Grant will give you good advice and will quote modifications.

The increased size of the RF-2900 (9-3/4 x 15 x 4-3/4 inches, reduces its portability somewhat, but the weight is only about a pound heavier than the RF-2200. Price ranges from list of $279.00 to NY discounters' $178.50. An earlier model, The RF-2800, was very similar; the digital readout was LED and only covered the SW spectrum. The RF-2900 has green flourescent display and covers 525-1605 kHz MW, 88-108 Mhz FM, 3.2-8 MHz SW1, 8-16 MHz SW2, 16-30 MHz SW3. Both are digital display, and panel lights may be switched off to conserve battery consumption. There is an analog dial in addition to the digital display. There's dual tone controls, 2 position bandwidth switch, AVC for FM reception, 5 position mode switch (AM, FM and 3 SW), a calibration knob for SW, an RF gain control and a BFO switch with pitch control (ECSS tuning reported as only mediocre). The main tuning knob pulls out for slow tuning and has a spinner. There is a built-in ferrite rod AM antenna and a telescoping whip for FM and SW. Two military-type side handles and a web shoulder strap. Circuit is the usual dual conversion superhet. There is no crystal calibrator (relies upon WWV for calibration). Inboard 4" speaker and 3 front panel jacks for phones, external horn, MPX out and recorder. Powered by 6 "D" cells or house current. IF frequencies are 3 MHz and 455 kHz. Sensitivity is rated at 1.0μV for SWL and SW2 and 2.0μV for SW3. Selectivity is 5 kHz wide and 3.4 kHz narrow with a disappointing skirt of 3-1. (Note: These figures refer to the 2800. A much-improved ladder type ceramic filter is a feature of the RF-2900 with improved selectivity.) Image rejection rated as 30dB at 6 and 12 MHz and 20dB at 24 MHz (image problems have been reported, requiring attenuation). Claimed drift is less than 2 kHz first 30 minutes, 1 kHz thereafter.

Negative features: SSB reception bothered by drift. Very light touch required for SW3 tuning. Images appear 4 MHz below actual frequencies but are of small importance as they generally fall out-of-band.

Barlow Wadley XCR-30: I bought one when they first appeared on the market, but I'll be darned if I can remember why I sold it. I was quite impressed with the rig.

Two chaps named Barlow and Wadley discovered a means of using the very sophisticated phased locked digital synthesizer used by the professional-type Racal receivers made in England. Their modification became known as the Wadley Loop circuit and is now found in various forms in such rigs as the new Drake R-7. They were able to construct a portable within the reach of Mr. Average. They have to be admired as they set up a factory in South Africa and I am sure, by the looks of the first models to appear, hired raw savages right out of the bush as assemblers. How Mssrs. Barlow and Wadley got those first models to work I'll never know. Early rigs looked like the parts had been thrown into a cabinet and stirred with a stick. B&W then installed product control and more modern assembly procedures, and the product became acceptable and quite popular. Our friend Gilfer claimed exclusive as he has with other items (WRTH, etc.) but they came available elsewhere. They are now offered by Radios International of Richardson, TX for $239.50, a good discount.

The controls of the little receiver are straightforward without gimmicks, and it looks neat but not exciting. The coverage is 500 kHz - 30 MHZ. Frequency readout on the analog scale is accurate to within 5 kHz. Modes are AM, CW and L/USB. Selectivity is 6 kHz on AM and 3 kHz on CW-SSB. It is claimed to be driftless. Sensitivity is rated as 1.0μV for 50mW. Image rejections: 50dB. Telescoping antenna and terminals for outside antenna. Weight is 9 lbs. 2 oz. Dimensions are 7½ x 11½ x 3-7/8 inches. Retail price is $289.50 ($239.50 discounted). Operates on 9 VDC and house current.

Negative features: No dial light. Prone to overload. Un-spectacular MW reception. FM band not included but available as an option.

I will admit this XCR-30 review is not as complete as I would have it, but my files fail to reveal information, and my memory doesn't help me much. I can say that I was content with the receiver, and its drawbacks were so small as not to have been remembered. Grant Manning of Radio West must consider the rig as worthwhile as he offers a modification to improve the selectivity for $45.00 (switches 3 kHz SSB filter into AM band).

I will end by remarking that these four portables are not easily found in the used market, hence no "used value" has become established.

Phillips RO-153: For the man who thinks he has everything. Reported by Steven d'Adolf in the November FRENDX, this is a new receiver from Europe which incorporates a microprocessor as part of its innards. Plug-in modular construction permits removal of circuits for testing or replacement.

The capabilities and various functions of this sophisticated gizmo are so exotic as to be beyond my comprehension, but for those more advanced in modern technology, here is the dope:

The microprocessor memorizes up to 10 frequencies for instant recall with a system called RAM (Random Access Memory). These frequencies can be changed at will by means of keypad buttons. By means of a small battery, the information is retained in non-volitile form for up to six months if the current is off. New frequencies can be tapped into the memory devices while listening to the frequency previously chosen. To avoid accidental erasure of stored data, special erase buttons must be activated simultaneously. The microprocess is also capable of all tuning and control, eliminating the need for a tuning knob which, however, is still there for "old time's sake."

For continuously variable tuning rate, the microprocessor "senses" the rate at which the tuning knob (if you still insist upon using it) is being turned, and adapts the synthesizer increments accordingly. These increments can be programmed to as low as 1 Hz.

The microprocessor also provides the facility of automatic searching (scanning) between the limits of any two programmed frequencies with the ability to cease this search when a signal is encountered. Automatic search is available in 9 rates from 1 Hz to 60 kHz per second. It is rumored that the microprocessor can also be programmed to deliver a pitcher of martinis.

Up to 5 crystal selectivity filters are available to meet the requirements of the user. (Steven's text was rearranged for brevity.)

Realistic DX-160: Radio Shack's inexpensive communication receiver (early models DX-150, A & B) selling for $179.95 with speaker. Available used for $100.00 and up. Very popular with new converts to SWL.

Covers 150-400 kHz LW, 355-1600 kHz MW, 1.5-4.5 MHz, 4.5-13 MHz and 13-30 MHz SW. Calibrated bandspread, variable BFO, AVC fast/slow, antenna trim, RF gain, ANL and an "S" meter. The rig can be improved tremendously with a digital readout and a crystal calibrator.

A review by Ralph Sanserino in the AWSLC Bulletin rates the DX-160 as well worth its price. Sensitivity is listed as LW-50μV, MW-100μV, 1.5-4.5 SW @ 3μV, 4.5-30 SW @ 4μV. Selectivity of 4 kHz at -6dB with a poor shape is only fair. Images appear above 4.5 MHz at 910 kHz below actual, and at 910 kHz above in the 13-30 MHz band. These images can be defeated with an outboard preselector.

"S" meter peg pounding can be corrected by changing R24 resistor to 4.7 or 4.6 K. For good MW reception, the ferrite rod MW winding must be replaced with a Radio Shack #270-1430 antenna coil. Apart from the rod, Ralph also notes the need for a crystal calibrator and suggests that all outboard aids purchased for the DX-160 will be useful on future gear or can be sold separately.

In an article in the December 1977 FRENDX, David Mattis claims the DX-160 to be superior to the FRG-7 in selectivity and suggests an outboard digital frequency readout transforms the set into a very satisfactory rig except for the images.

In the December 1978 FRENDX, the same Mattis reports easy installation of a DRO for the DX-160: no soldering, hole drilling or modifications required. I know of three digital readouts available for the 160: the same David Mattis, P.O. Box 162, Morton Grove, IL

60053 - $114.95 (quoted in 1978); Torrestronics, 4850 Hollywreath Ct., Dayton, OH 45424 at $135.00 (kit $95.70); Radio West, 3417 Purer Rd., Escondido, CA 92025 (714/747-2891) Model DD2 for $150.00 installed. Radio West can also install antenna coil, change "S" meter resistor and install crystal calibrator for a reasonable charge.

SX-190 and AX-190 by Radio Shack are still available in Canada Shacks. Originally priced in US at $249.95. Available used for about $160.00. Have been known to bring as much as $480.00 in Australia. Only a short time ago was considered best available for under $450.00.

In April 1977, FRENDX Ed Shaw had an article on the SX-190 and its Ham band twin were manufactured in Japan for Radio Shack and sold for $249.95.

The circuit resembles the Hallicrafters SX-117. Today (1977) it compares favorably with the most popular DX machines. Its 60 meter prowess is unsurpassed. It was the first receiver to include most of what every DXer needs. It is a crystal controlled VFO receiver with preselection. Excellent crystal controlled USB/LSB ability. Has tunable IF pass band with either a Q peak or T notch.

Analog frequency readout to 100 Hz (0.1 kHz). Selectivity is superb allowing strong signals 5 kHz apart to be separated. The SX-190 is supplied with crystals for the 75, 49, 41, 31, 25, 19 and 16 meter bands plus the 20 meter Ham band and the 11 meter CB. There are two spaces for additional coverage. These are generally used for the 60 and 13 meter bands. The AX-190 is supplied with crystals for Ham bands, and conversion to SWL requires only additional crystals. Although the lower limit of the SW coverage is listed as 3.5 MHz, a crystal providing 3-3.5 MHz coverage will function satisfacrotily to include the 90 meter band.

Additional coverage can be obtained by deliberately mistuning the preselector. For example: the 75 meter crystal normally provides 3.5-4.0 MHz coverage. The preselector will peak at about 3.5 MHz. However, a second peak will be discovered just above 9 MHz. With the tuning knob set to zero peak, this 9 MHz setting (with the "S" meter) you will now be able to bring in signals in a band 9.34-8.84 MHz which will read *backwards* (frequencies will decrease as you approach 500 on the dial). All the installed crystals can be mistuned in this manner thus expanding the frequency coverage into usable off-band areas. You will, of necessity, require charts to be able to read these "trick" frequencies. For example, the above 9.34-8.84 MHz spread will read:

Dial Reading	0	100	200	300	400	500
Frequency	9340	9240	9140	9040	8940	8840

The balance of Ed Shaw's article covers instructions for peaking and aligning the SX-190. Unfortunately, I have misplaced part of this section so will be unable to furnish copies. However, I am sure Ed will be happy to send you a copy for an SASE. His address is 507 Lafayette Ave., Lexington, KY 40507.

The Realistic DX-300 Story: Some of this is hearsay and putting two and two together, but it also is factual. Our first introduction to the triple conversion loop circuit (Phase Locked Digital Synthesis) was in the Racal receivers manufactured in England. These are very expensive and very sophisticated pieces of equipment which have been, more or less, the "official" receivers for commercial broadcasters and monitoring services. Not many afficionados can afford $6,000-$7,000. A few used ones have found their way into the hands of some of our more dedicated hobbyists.

In the early 1970's, two chaps in South Africa (Barlow & Wadley) either discovered a cheaper way of manufacturing the Racal system or invented a simplier means of tripling the loop. The result was the Barlow Wadley XCP-30. Unfortunately, the early models were full of bugs and many arrived from the factory looking as if the parts had been thrown together with wild abandon. The later models have been greatly improved, after some changes, and the introduction of quality control. Mssrs. Barlow & Wadley discovered their new circuit to be both extremely critical and temperamental.

Next to jump on the bandwagon was Drake with their SSR-1. Now we resort to a bit of guessing. The SSR-1 failed to become popular, and I imagine Drake regretted its introduction. It was found that more than quality control was required to manufacture a $6,000.00 rig to sell for $350.00.

Next, Yaesu Musen came along with their contribution: the FRG-7. Some very fine Japanese engineering whipped up a looper that worked. The FROG has been a success as can be seen by checking the receivers used in the club bulletin logs. Unfortunately, the Super Frog (the FRG-7000) hasn't much to offer except a digital readout and clock and a higher price. Speaking of price, the Yaesu FRG-7 now sells for $370.00, but the Sears Roebuck catalog FRG-7, which is exactly the same receiver, except for an even better appearance, is now being sold for $279.95 (probably the best bargain in the SWL market). Selling a speciality item to a bucolic clientele in a farmer's catalog is not too durn smart.

Now we come to mostly rumor. The Tandy Corporation (which operates the Radio Shack chain) was impressed with the success of the Yaesu FRG-7 and decided to get into the act. They announced their version of this triple conversion loop receiver (the DX-300) in the 1979 catalog with an October 30 delivery date (1978). It was believed that Yaesu was manufacturing the DX-300 for Tandy, and its appearance in the catalog illustration seemed to verify this. At least the Yaesu FRG-7 and FRG-7000 were very much in the minds of the designers. The fact that October came and went without the appearance of the 300, and the continuing delay, has fostered rumors of contract difficulties due to the falling dollar value in Japan, that technical problems had slowed production, etc.

One rumor was that the first shipment was substandard and was refused by Tandy. We do know that only a few of the receivers have been delivered, and those have had varied acceptance. A number of recipients have requested (and received) refunds. One DX-300 is listed for sale for $325 in the March FRENDX. Several users report tuning difficulties, and others indicate that the manufacturer is having the same problems that confronted Barlow & Wadley and Drake. These problems are not insurmountable, as witness the quite satisfactory present-day XCR-30s, but Tandy would be wise to stop all deliveries before a bad reputation is established beyond repair. I only hope that the bugs have been eliminated before I receive my DX-300 which I have had on order for some months. Otherwise, back she goes (after a fast checkout for the benefit of SDDXC members).

I am of the opinion that my DX-300 (which arrived yesterday, 3/15), being more recently off the assembly line, has had better quality control and/or has been de-bugged. The adverse reports appearing in various bulletins must have been caused by faulty or hurried production, not unusual with a new product. I can find very little to fault: mostly in design, not performance.

Sensitivity is outstanding. Selectivity is quite good, a strong signal covering only 8 kHz. Two medium strength signals 5 kHz apart can be separated nicely. Its selectivity is superior to that of the FRG-7, but serious DXing will require a sharper filter, as do most of the new rigs.

The audio offers a three position bandwidth and is excellent. SSB and CW tune very professionally, and ECSS tuning is very effective.

Side-by-side comparative operation with my Dymek DR-55 fails to downgrade the DX-300 in any way. Negative features encountered include a rather sloppy calibration of the preselector drum and a rotary switch frequency control would have eliminated the need to retune the MHz dial after having tuned in the signal on the kHz band.

The DX-300 is a business-like piece of gear, both to operate and to look at. I am very pleased with it, and it immediately goes into surgery for a Collins filter implant. If I am correct in my assumption that the early models may have been faulty, avoid (or double check) all serial numbers lower than 8-00762, the number of my receiver.

Realistic DX-300 Update: On April 11 my DX-300 came home from the hospital. Dr. John Kolb performed the operation. A Collins 2.75 kHz mechanical filter with a shape factor of 1.3-1 was implanted with skill. The "Stand By" position of the Mode switch was used as the filter switch. You should hear the set now! With the new filter cut in, the signal which used to sort of slide in, now plops in. A timid little signal just 5 kHz from a blockbuster can now be handled very well. An unexpected bonus was the two stages of amplification as part of the filter installation. The only feature which will take some getting used to is the incorrect reading on the digital display of about 2 kHz up. This same thing is normal when switching to either USB or LSB and occurs in all receivers.

The operation cost $70, but don't take this as gospel. Best get an estimate. When John was checking the set out, he was unable to adjust the LSB to equal the performance of the USB mode. The adjustment must be well hidden so we will have to await the service manual I have had on order for some time. If this problem isn't easy to solve with the help of the schematic (when it gets here), I'll report accordingly. I am happy that my prognostication made last September has proven to be correct.

The DX-300 IS a good receiver and can be modified to become an excellent receiver. Two experts are available for modifications: Radio West 3417 Purer Rd., Escondido, CA 92025 (714/741-2891) and John Kolb, 540 S. Kalbaugh, Ramona, CA 92065 (714/789-6015; it's best to call in the evenings or on weekends).

DX-300 Tips: Member Dick Lucas suggests that if your DX-300 has an objectional AC hum you can defeat it by using two 6 volt lantern batteries in series connected to the *inside* battery connections. (Leave the "C" batteries in their compartment, but deactivate them with bits of cardboard, inserting the lantern battery leads between the cardboard and the spring terminals. To return to portable use, pull out both cardboard and battery leads.) If you connect the lantern battery leads to the 12 volt jack, the dial lights will consume most of the battery current.

Dick has also read the instruction manual (see P. 13, Bulletin 19) and learned why there are two antenna terminals. Defeat of MW and LW spurs and improved audio and SSB reception occur when your antenna is connected to the screw terminals marked "Antenna." The coax terminal is "hotter" but can overload the front end.

Realistic DX-300: Jerry Lineback also has a few words to say about the DX-300 and makes an excellent suggestion, which also applies to other receivers: "Read your Instruction Manual." He remarks that most so-called "shortcomings" of this quite good receiver, reported by unhappy owners, are explained, and solutions are given in the Manual. I second the motion, and as I have said elsewhere, Radio Shack will listen to your problems. The Tandy organization has one big problem: most of the franchise dealers are merchandisers, not Radio Men.

BC and Low Frequency Tuning Tips for the DX-300: There is a difference between the screw terminal and the coax connection for the antenna.

The coax produces a stronger signal on SW, but overloads anything below 1600 kHz. What diference may be will have to wait for the arrival of the schematic (service manual on order). This receiver has a very hot front end and is easily overloaded on the lower frequencies with an outside antenna. It has a built-in ferrite rod antenna for the broadcast band as well as a demountable whip for the SW. Overloading creates distortion and spurious signals. This can be controlled in some cases with the Attenuator Switch, which only functions when the antenna is connected to the coax fitting. First, try the 20dB setting, then the 40. If there is still too much signal, disconnect the outside antenna. Overloading cannot be controlled by backing off the RF gain.

I have a number of antennas which can be selected at a wall switch. Disconnecting here leaves about 3 feet of wire to the receiver. This piece of wire, which must have some proximity coupling to the outside system, seems to be idea for some BC frequencies. Now I automatically pull the antenna wall switch when I wish to work standard broadcast. Further dampening can be done with the Attenuator.

One warning: The set *will not* function below 1000 kHz unless the MHz display is set to zero, and this should be treated as a number and retuned after your kHz signal is tuned. This retuning should be done after each frequency change, even on the same band. The same holds true for the Preselector drum. Watch the "S" meter. I tried tuning the BC band below 1000 kHz with the MHz display a blank and I thought I had busted something.

Not much is found on the two lower bands. On the 0.15-0.5 MHz band you will find it is necessary to tune both the kHz dial and the Preselector simultaneously. The 0.01-0.15 MHz band has a single setting on the Preselector drum. Spurious signals will mess up the lower bands if the Preselector is improperly positioned.

DX-300 Single Sideband Tuning and MW Antenna: In some of the late models of the Realistic DX-300, the LSB will tune very nicely, but the USB refuses to deliver a clear signal. This is due to another early production boo-bo that is just now showing up. Radio Shack will, of course, correct this problem, but for those capable of doing their own work, the trouble lies with the #C345 capacitor. The factory attempted to economize by supplying only one trimmer in the BFO circuit which adjusts the LSB (depending upon a fixed capacitor to set the USB simultaneously). This would be fine if all receivers were the same. However, there is just enough difference in sets as they leave the assembly line to upset this brilliant idea.

The offending #C345 capacitor is 43ρF and is connected between the L309 coil trimmer and C346 on the IF audio PC board. You can either substitute another capacitor of from 27 to 33ρF, or do it correctly with another trimmer. If you do open the cabinet to make the above modification, you might wish to install a switch enabling you to disconnect the ferrite rod antenna for the MW band. This antenna is a mistake. It enables the owner to tune the MW band without an external antenna but louses up MW DXing as one cannot take advantage of tuned antennas or a directional loop. The ferrite rod has two windings: one for the 0.5-1.6 MWBC band and the other for the .15-0.5 MHz LW band. Install a small toggle switch on the rear close to the top (for easy access from the front) which switches from the ferrite rod MW winding to a standard broadcast band antenna coil (Miller #6300) installed (by you) to replace it.

The main trouble with the DX-300 is that it was rushed by the technical department to satisfy the promotional department. The sales department got their two cents worth in by insisting upon such nonsense as the ferrite rod antenna and the two LW bands. Too many cooks, etc. I don't envy the role of Dr. Roberts in Fort Worth, TX on whose shoulders the sins of the "system" have fallen. He at least, knows the score and, hopefully, can convince Tandy to change some early ideas. Basically the DX-300 is a good receiver, and I am sure it will become popular when the public is convinced there are no more "hidden" bugs."

Ironic Rob Harringon, the chap that made such a hullabaloo over a defective DX-300 which he broadcast via all the club bulletins, now has formed a DX-300 Fan Club. All those purchasers who weren't frightened off by Rob's diatribe can now join him in rejoicing. I would suggest that club editors should be more cautious in publishing one side of a picture before investigation. That one report did enormous harm.

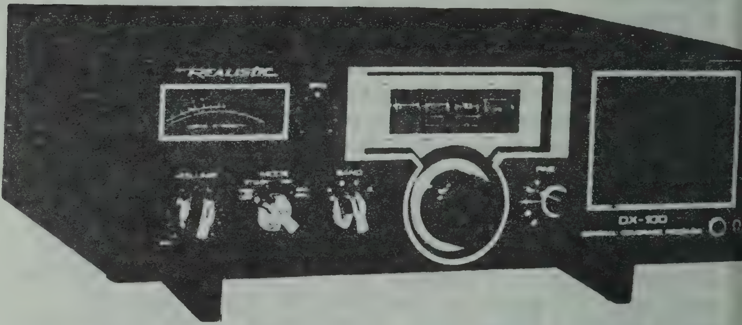
Radio Shack has admitted to a premature release of the DX-300 (before the bugs were discovered and eliminated) and have gone to extreme measures to rectify the problem and to see that all purchasers were satisfied. If anyone still is unhappy with a Realistic DX-300, he need only telephone or write to Dr. Frank Roberts, Merchandising Department, Radio Shack, 1500 Tandy Ctr., Fort Worth, TX 76102 (817/390-3244).

If the MHz dial on your DX-300 will do anything more than position the MHz reading on the digital readout, and adjust the setting after the kHz dial has brought in the signal, the set is one of those that got by the final inspection and is defective. You should *not* be able to do any tuning with the MHz dial.

Another defect that has shown up in some of the earlier models is an inability to obtain a clear signal on the USB. This will be corrected by Radio Shack. It is a simple replacement of a small capacitor which proved to be inadequate. Tandy's supplier discovered too late that certain components of the DX-300 tested OK in final inspection but broke down after use by the purchaser.

DX-300 Manufacturer: My report in last month's Bulletin that the DX-300 was manufactured by Yaesu is incorrect. My informer, Sandy Blaize of SPEEDX advises that Radio Shack corrected him. Both the DX-300 and DX-160 are manufactured by General Research and Electronics of Japan.

The December issue of SPEEDX has two articles on the DX-300: one pro and one unhappy. The unhappy one had six receivers and returned the sixth for a refund. Radio Shack made a big mistake by not recalling all 300s for a factory rework. They thought if they waited long enough the problem would go away. The one I purchased and modified worked as well as a modified FRG-7 or FRG-7000.



Realistic DX-100, which I jokingly referred to as the Cook Island Special in Bulletin 29, turned out to be unfair as the little receiver can get Cook as satisfactorily, but not as easily, as can a receiver costing many times the 100 bucks.

Unfortunately, it is just another example of an SW receiver being designed by the sales department not by a technician or a knowledgeable SW buff. Like most single conversion rigs, it is hot-as-a-pistol, the signal not being subjected to the degradation of complicated circuitry, and the selectivity is uncanny for a receiver of this category and price.

I tested it beside my $1,600.00 Drake R-7/DR-7 and was able to bring in stations I thought only the Drake could handle. Tahiti on 15170 kHz was not bothered by VOA on 15175 kHz. Try that on your expensive rig! And, to my chagrin, the signal was clearer and more legible. Other surprises on the plus side were a true "S" meter instead of the usual pin-bumping tuning meter/battery tester combine. The BFO pitch control allowed good ECSS tuning. The rig has a front-facing internal speaker without the usual dime-store sound.

Now comes the third example of poor design of contemporary Radio Shack Realistic receivers (see Bulletins 27 & 28 descriptions of DX-302 and DX-200): The tuning system is a mess. A drum tuner with 4 bands (vertical) covers MW and 3 SW: 1550-4500 kHz, 4500-13000 kHz and 13000-30000 kHz. The frequency markings on the first SW band are 200 and 500 kHz apart with 200 at the lower end and 500 at the upper; on the 13000 band they are 500 and 1000 kHz apart; and on the 13000-30000 band they become 1000 and 2000 kHz. This ridiculous spacing is supposedly made usable by the addition of a fine tune or vernier dial to one side marked with divisons of 100 either side of a zero. These divisions have nothing to do with frequencies. You are supposed to be able to use the drum markings plus the fine-tune dial markings to log captured SW stations. Oh yeah! Failure to reset the MHz dial to the exact same spot on the MHz drum can change the vernier setting as much as 20 to 30 kHz. Tuning this receiver to a wanted SW frequency is impossible without an outboard digital display, or to a previously logged signal without the use of a crystal calibrator. The only method of using the SW facilities of this receiver is to tune willy-nilly until a signal is heard then attempt an identification without knowledge of more than an approximate frequency, then write down the position of both dials, hopefully for a later return. Unless the MHz dial can be set with a crystal calibrator, the MHz logging can only be approximate which means that the vernier dial logging will be worse than approximate. This is why I say it is impossible to take advantage of the excellent capabilities of this little receiver without additional equipment.

I will go out on a limb by stating that the Realistic DX-100 at $99.95 is an excellent SW receiver except for certain sophisticated modernisms such as band pass tuning, up conversion, shaft encoder, memory bank, etc., but ONLY with the assistance of a crystal calibrator or, better yet, a digital frequency readout. The above mentioned sophistications are nice to have, a joy to knob twisters and a means of the degradation of your bank balance, but are not essential to the capture of some very nice SW DX.

Further description of the DX-100 is: front panel phone-jack not for outboard speaker (built-in speaker very good). Use of ANL switch drops volume slightly. Both main dial and "S" meter lighted. Modes are AM, AM/ANL, Stand-by, SSB/CW. BFO pitch control very useful. Dimensions: 4-3/4 x11-13/16 x 9 7/8 inches HWD at 4 lbs. 7 oz. Power: 120 VAC 60 Hz or 12 VDC (240 VAC optional). Antennas: built-in ferrite MW rod and extendible whip for SW. Appearance: sexy black moderne.

To me, the big disappointment is the poor introduction to the joys of SWLing for the beginner and the fact that a potentially-fine compact rig for automobile mounting is impractical because of the awkward tuning system.

If a smart entrepreneur like Radio West could find time to brew up an inexpensive digital readout for this rig, we would have an ideal beginner's receiver and a good SW rig for the car at a reasonable price.

Realistic Radio Shack DX-200: Page 26 of the AWSLC bulletin for August has a mini-evaluation of the new DX-200 replacement for the discontinued DX-160. The DX-200 is a conventional single conversion superhet tuning from .15 to 30 MHz with analog readout (not digital), a 455 kHz IF and about the same innards as the DX-160.

The new black plastic decor replaces the brushed aluminum 160. The specs claim sensitivity of 1µV at 10dB S/N, and the selectivity is rated at 4kHz at -6dB and 8 kHz at -40dB instead of the usual -60dB which could be a "sly" method of concealing a poor shape factor. Extrapolation indicates a factor beyond the norm.

The drum type tuning system could be an improvement over the slide-rule method of the DX-150-160. According to today's prices, the $229.50 nut is not too bad for this "beginner's" receiver. It could be ideal for "boot" training in the hobby.

Sine typing the above, I was able to obtain a DX-200 for testing. Here is an example of a receiver that has been ruined with a Mickey Mouse tuning system and exemplifies my remarks made under "Sensitivity" elsewhere in this Bulletin. The receiver is hot-as-a pistol with a sensitivity equal to the best. Selectivity is outstanding in a receiver of this price range, bringing in Buddapest on 15220 kHz with WYFR on 15215 kHz blatting away. Also tuned in Radio Sweden on 15315 with Bulgaria on 15310 going full blast. Try this on your receiver! With all that selectivity (on a 50' longwire), the audio is superb, clean and crisp. Stability is fine, holding solidly after warm-up. MW BC seems both sensitive and selective but behaves strangely with the signal "plopping" in instead of sliding in. The signal appears as an undistorted mess with a crystal clear spot in the center. Unfortunately, the MW band has some bothersome birdies. The LW is something else again, being plagued with birdies all over the place. It seems to be quite sensitive, but there isn't room for signals with the rampant bird population. The so-called "S" meter isn't, being only a tuning aid which hits the peg unmercifully.

Now we come to the bad news: The double drum tuning system must be spring-loaded-string operated as there is noticeable play, and the dial springs back from the stop at both ends. The upper drum is marked in MHz and the lower in meters, adding to the confusion. It requires mental arithmatic to coordinate the two readouts.

The upper drum has 6 scales: a 1-100 logging scale and 5 MHz scales corresponding to the markings on the Band Switch. On these scales appear red dots indicating settings for the SW and Ham bands: 10-11, 13-15, 16, 19 and 20 on the 13/30 MHz scale; 25, 31, 40, 49 and 59(60) on the 1.6/4.5 MHz scale; and 80(90) meters on the .52/1.6 MHz scale. Frequencies on the upper drum read correctly only when the lower drum is turned to the "set" position. Other than the red dots on the upper drum, the figures have small significance as the frequencies marked in kHz on the lower drum only read correctly for the "dot" positions. Setting of the Band Switch lights a red LED on the upper drum indicating selected band. Unfortunately, a similar red LED is omitted from the lower drum.

The lower drum contains 12 so-called bandspread scales besides a 1-100 logging scale. Half of the scales appear above the division lines and the other half below. Scale indicators are shown on both sides of the drum: the upper to the left and the lower to the right. The numbers appear to the right of the line markers. A vertical drum would have simplified the arrangement. Also, the numbers could appear on slanting lines.

Another confusing feature is that the line markings differ according to frequency, being divided variously in 10, 20, 50 and 100 kHz steps, requiring counting to ascertain the correct frequency. The 12 bandspread scales are marked as 10-11, CB, 13-15, 16, 19, 20, 25, 31, 40, 49, 59(60) and 80(90) (the brackets are mine). The 59 scale lacks 100 kHz of coverage, going down to only 4850 kHz. The 80(90) scale lacks 30 kHz coverage as the dial bounces back from the lowest setting of 3220 kHz.

The worst feature is the crowding on the so-called bandspread sacles, with only ½ inch of tuning space on the 25 meter band. Either redesign or a vernier fine-tune control is definitely needed. Tuning space varies from 7/8" for the 13 meter band; 1"-16M; 2-5/8"-19M; ½"-25M; 15/16"-31M; 1½"-41M, 3-1/8"-49M; 4½"-60M; and 1½"-90M. The bands with the smallest allowable space for tuning require a steady hand and an eagle eye. Do you wonder that I call it a Mickey Mouse system? It is far from a happy one and I anticipate complaints.

The DX-200 has a crystal marker but the one I tested didn't produce a "constant tone," just heterodyne. The antenna must be disconnected when calibrating. The black plastic cabinet and front panel can be termed "sexy-moderne." Size is 5-3/4 x 14½ x 8 inches HWD. The weight is 4.1 kilos. There is no facility for battery operation. The price is $229.50. The owner's manual is well done and contains a schematic but no technical data other than the specs.

The bottom line: A potentially-good single conversion receiver ruined with an impractical tuning system and poorly controlled birdies in the MW/LW. With better control of the birdies, an add-on digital readout and a trimmer control, it could be very acceptable.

Realistic DX-200: Radio Shack's replacement for the discontinued DX-160. A very nice and business-like

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looking receiver very much like the Kenwood R-300 with two drum analog readouts: one for MHZ and the other a kHz bandspread. No digital readout, as expected. Sells for $229.95, although some stores are asking $250.00. Circuit is a single conversion superhet with a 5 element ceramic IF filter for a reasonably-good selectivity (455 kHz).

Covers 150 to 400 kHz LW and 520 kHz to 30 MHz in 5 bands, each with its bandspread. (150-400 kHz LW, 520-1600 kHz MW and 1.55-4.5, 4.5-13 and 13.30 MHZ SW). 500 kHz crystal marker for calibration (Mickey Mouse but effective). Antenna Trimmer, BFO Pitch control, Slow and Fast AGC control. Modes: AM, LSB, USB and CW. Signal Strength "S" meter. Both tuning knobs with spinner. Adjustable cursor (display indicator) for dial calibration. Built-in speaker, out-board speaker jack and mute facility. Earphone jack. 120 VAC 60 Hz power, no battery facilities.

Complicated, but effective, calibration system using 500 kHz crystal marker. RF Gain control and regular "volume" control. Dual antenna terminals (50 ohms and Hi-Z Longwire).

Sensitivity rated at 1µV; image rejection 55dB at 250 kHz, 40dB at 1 MHz, 30 dB at 7 MHz and 14dB at 21 MHz. Selectivity listed as 4 kHz at -6dB and 8 kHz at -40dB (extrapolates to approximately a 3 to 1 shape factor, which is not so hot). Actual selectivity measurement requires optional test. Single conversion superheterodyne circuit with 4 ICs, 13 transistors, 16 diodes and 5 LEDs. BFO Pitch range ±3 kHz. Audio output 1.5 watts, 10% THD with claimed good fidelity.

The bottom line: Could be a very satisfactory lower priced beginner's receiver or a second stand-by.

Radio Shack Power Inverters: Two models (100 watt and 300 watt output) enable you to use appliances such as TVs, radios, electric typewriters, electric razors, mixers or any device requiring regular house current with wattage ratings less than 100 or 300 watts. Your SW receiver can, in this way, be powered by the battery of your car, RV or boat. Most radios use approximately 30 watts, so the 100 watt inverter will be ample. However, if you enjoy an RV it would be wise to purchase the larger size for other uses. The smaller unit has a 12

Amp drain under full load, much less with just a radio. The 300 watter pulls 25 Amps under full load, and it is wise to run your engine if working to capacity. Both units have a booster switch for a low battery and overload breaker protection. The 100 watt unit sells for $39.95 with a cigar lighter plug. The 300 watter goes for $79.95.

Realistic DX-302: The Radio Shack replacement for the stillborn DX-300 which has been the cause of wailing and gnashing of teeth appears to have fathered an improved model supposedly without the faults of its predecessor. If firms like Tandy, Drake, Kenwood, etc. would hire just one medium-grade SWL instead of these boy-wonder engineers with still-damp diplomas, they wouldn't flood the market with untested receivers full of birdies, images, poor selectivity and 12 hour clocks on a 24 hour device.

Harold Sellers, Chairman of the DX Equipment Information Committee of ANARC has kindly sent me a schematic and detailed specifications of the new DX-302. For an SASE-10 and two loose 18¢ stamps to pay for the Xeroxing, I'll send copies.

Harold has made a list of the changes to the DX-300 found in the new DX-302. I will not yet pass this on to you as the factory specifications are quite unusual in that they have two columns of factors: one marked "Nominal Specs" and the other "Limit Specs." I am afraid that this may mean "What we aimed at Specs" and "What we got Specs."

For example: The "Nominal" wide IF filter is rated at 3.5/6 kHz (-6/-60dB) while the "Limit" column shows 6/8.5 kHz (-6/-60dB). For the narrow position, the factors are "Nominal" 2.5/4 kHz (-6/-60dB) while the "Limit" is 4.5/6 kHz (-6/-60dB). As to other differences, Spurious Rejection is rated "Nominal" at 60dB with the "Limit" rating as 30dB. As these figures are very different, a considerable doubt can be excused. Which figures can we accept as actual? Until this question is answered, I suggest we suppress our enthusiasm and refrain from pounding on a Radio Shack door with a fist full of greenbacks. Details at eleven!

(See factory specs on pp. 144-145.)

HOBBY ABREVIATIONS

AA	Arabic
Afr	Africa
AM	Amplitude Modulation
Amer	America(n)
ancr	Announcer
anmt	Announcement
ant	Antenna
aw	auf wiedersehn
BCB	Broadcast Band
BFO	Beat Freq Oscl
CB	Citzens Band
CC	Chinese
cl	classical Mx
CQ	General Call
CW	Code
DA	Directional Ant
DX	Long Distance
DXF	DX Forum/Px
DXpdn	Expedition
EC	East Coast
EE	English (Eng)
EM	Emisora
ET	Equip Test
Eur	Europe
EZL	Easy Listen
f/c	freq check
Frq	Frequency
FF	French
f/up	follow up
GG	German
GHz	Gigahertz
gnd	ground/earth
GMT	General Mean Time
het	heterodyne
hi	a chortle
hrd	heard
Hz	Hertz
ID	Identity
ISB	Independent Side Band
JJ	Japanese
jx	jungle
kHz	Kilohertz
kw	kilowatt
LA	Latin America
L&C	Loud & Clear
lang	language
LP	Low Power
LSB	Lower Side Band
LW	Long Wave
MC	Morse Code
MC	Master of C.
min	minute
MoR	Middle Road
MHz	Megahertz
MW	Medium Wave
mx	music
NA	North America
NAfr	N.Africa
nx	news
o/	over
OC	Open Carrier
OM	Old Man
Px (pgm)	Program
QRM	Manmade Static
QRN	Atmospherics
QTH	Address
QST	Reception Acknowledged
R	Radio
rpt(d)	report(ed)
rcr	Receiver
RR	Russian USSR
rr	Rock Music
RTTY	Teletype
Rel	Religious
SASE	Self Addressed Envelope
SASE#10	#10 Cover
SID	Singing ID
sig	signal
s/on/off	sign on
sp	short path
SS	Spanish
Sta	Station
SSB	Single Side Band
SSTV	Slow Scan TV
TC	Time Check
tent	tentative
TVI	TV interference
USB	Upper Side Band
V	variable
WC	West Coast
wx	weather
yl	young lady
xyl	married yl
xmtr	transmitter
xmsn	transmission
//	Parallel
73	Best Regards
88	Love & kisses
IS	Interval Signal
SDDXC	The Leader
TUIT	what you get around to

Z & UTC = GMT

TIME & FREQUENCY STATIONS

Many low power xmtrs not listed. See WRTH for balance WWV & WWVH (Hawaii) 2500, 5000, 10000, 15000 kHz Australia 4500, 7500 & 12000, Brazil 8721, Canada - 3330,7335 & 14670, Chile 4298 & 8558, China 10000 & 15000, Germany 77.5, 182, 4525 & 16980, England 16, Hong Kong 500, 3842, 8539, 13020, 17096 & 22536 - - Moscow 4996, 9996 & 14996

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AP HAP HAP HAP

The Handicapped Air Program is a world-wide non-profit organization supported by radio clubs and dedicated to aiding the handicapped so that they may enjoy the hobby of shortwave listening. Effort is made to supply equipment and friendly help to the bedridden, confined or institutionalized blind or disabled, individually or in groups, so that they may also enjoy the fascinating hobby of shortwave. The work is financed by donations, auctions, promotions and radio businesses which donate percentages from sales. Hobbyists can help with individual donations, saving commerorative and foreign stamps which HAP turns into cash, with equipment, working or not, and hobby items such as books, pennants, BCer's "T" shirts, colorful QSLs and memorabilia, all of which can be auctioned off at club meetings. It costs *so little* to help the less fortunate *so much*.

Handicapped Aid Program
Route 4, Box 32, Rolla, MO 65401

Courtesy SDDXC

Factory Specifications of the Realistic DX-302: This is a very strange document. It lists two columns of factors or values: one marked 'Nominal Spec" and the other as "Limit Spec." As no explanation is given for this elsewhere in the text, we must draw our own conclusions. I would suspect that the 'Nominal" could represent the target values and the "Limit" either the actuality or the acceptable limit beyond which the receiver would be rejected. It creastes a very unsatisfactory picture and may be like the automobile factory where the last car off the assembly line before shut-down for readjustment of tolerances is a real dog. What ever it is, it is confusing.

Description	Condition	Nominal Spec.	Limit Spec.
Frequency Coverage	Band A	10 ~ 150 kHz	10 ~ 150 kHz
	Band B	150 ~ 500 kHz	150 ~ 500 kHz
	Band C	500 ~ 1600 kHz	500 ~ 1600 kHz
	Band D	1.6 ~ 4.5 MHz	1.6 ~ 4.5 MHz
	Band E	4.5 ~ 12 MHz	4.5 ~ 12 MHz
	Band F	12 ~ 30 MHz	12 ~ 30 MHz
Sensitivity (S + N)/N = 10 dB AF Output = 50 mW			Not specified
	50 kHz	AM 30 µV SSB 30 µV	AM 50 µV SSB 50 µV
	150 kHz	5 µV 5 µV	10 µV 5 µV
	300 kHz	1 µV 0.5 µV	5 µV 5 µV
	900 kHz	0.5 µV 0.3 µV	2 µV 1 µV
	3.1 MHz	0.5 µV 0.3 µV	2 µV 1 µV
	7.1 MHz	0.5 µV 0.3 µV	2 µV 1 µV
	15.1 MHz	0.5 µV 0.3 µV	2 µV 1 µV
	28.9 MHz	0.5 µV 0.3 µV	
Image Ratio	10 ~ 50 kHz	Not specified	Not specified
	100 kHz	70 dB	50 dB
	300 kHz	70 dB	50 dB
	900 kHz	70 dB	50 dB
	3.1 MHz	60 dB	50 dB
	7.1 MHz	60 dB	50 dB

		15.1 MHz	60 dB	50 dB
		28.1 MHz	60 dB	50 dB
Intermediate Frequency		1st	55.5 ~ 54.5 MHz	
		2nd	3 ~ 2 MHz	
		3rd	455 kHz	
Spurious Rejection at 7.1 MHz		between 5 MHz and 150 MHz	60 dB	30 dB
Birdies at 7.0 MHz		(S + N)/N = 10 dB	5.0 µV	10 µV
Input Attenuator		0 dB		
Low Z		20 dB	20 dB	14 ~ 26 dB
		40 dB	40 dB	34 ~ 46 dB
HI Z		0 dB		
at 7.1 MHz		20 dB	20 dB	Not specified
		40 dB	40 dB	Not specified
Selectivity	WIDE	–6 dB	3.5 kHz	6 kHz Max.
		–60 dB	6 kHz	8.5 kHz Max.
	NARROW	–6 dB	2.5 kHz	4.5 kHz Max.
		–60 dB	4 kHz	6.0 kHz Max.
Audio Output		8Ω, 10% T.H.D	1.5 W	1.2 W
Phone Jack Output		8Ω, 0.5 W AF Output	70 mV	35 ~ 140 mV
Tape Output		7.1 MHz 1 mV (1 kHz 30% MOD), 0.5 W AF Output	300 mV	150 ~ 600 mV
Signal-to-Noise Ratio		7.1 MHz 1 mV (1 kHz 30% MOD), 0.5 W AF Output	40 dB	35 dB
Hum & Noise		at 8Ω Speaker Output	AM/SSB 1.5 mV	AM/SSB 5 mV
(VOLUME : Minimum)		at 8Ω Phone Jack Output	AM/SSB 0.15 mV	AM/SSB 0.5 mV

Realistic DX-302: (Refer to article in Bulletin #25.) Radio Shack finally loaned me one of the new DX-302 replacements for the discontinued DX-300.

Frankly, I am disappointed. After their experience with the poorly-designed DX-300, you would expect something better. I even hesitate to state that the 302 is better than a good 300. The sensitivity is not as good as the older machine and is poor in the LW/MW spectrum. Also, the MHz synthesizer is tricky and must be retuned and peaked after the kHz dial has been set to the frequency on the display. I even detected the need for retuning the preselector. In order words, you can't tune this receiver without the signal being there. Failing an improvement in the synthesizer circuit, it should have either an electric lock or an LED indicator. The system used by the FRG-7 would improve the DX-302 tuning method.

The selectivity has been improved but at the cost of good audio. The "narrow" position produces audio similar to a duck with laryngitis.

The awful part comes when you attempt MW DXing. I live close to the border and any attempt to "reach out" on the MW band stirs up cross-modulation of Tijuana stations. I can't even get Los Angeles stations without a lot of Español mixed in with the signal. Attenuation helps but cuts the sensitivity too much.

I feel badly having to report so negatively on a rig which was loaned to me. Maybe I can find something good with the DX-200. I just cannot understand how a concern with the retail organization of the Radio Shacks can afford to make so many mistakes and expect to retain a good reputation.

Evaluation of the RP-8880 Sanyo 9 Band All Wave Receiver:
The RP-8880 is Sanyo's contribution to the new crop of communications receivers coming from Japan. It is an impressive looking rig with more attention paid to cosmetics than to its electronic intestines. However, with the help of an amplifying preselctor, and some rather complicated tuning, good results are possible. It is about the size of the new Panasonic RF-4800. It does not have digital readout. It seels for less than $300, depending upon the dealer.

The 8880 has 9 bands and three tuning dials: the first with AM 525-1615, FM 88-106, LW 150-405, and MB 1.6-2.3;

the second with 5 short wave bands: 2.3-5.95, 5.95-6.20, 6.20-10.0, 11.7-20.0 and 20.0-30.0. Full SW coverage with a gap between 10.7 and 11.7 and, lastly, a fine tuner (or bandspread dial) which covers 100 kHz segments with a 30 kHz overlap at each end. This bandspread dial is in 5 kHz segments with 1 kHz markers. Both the bandspread dial and the main SW dial have a movable pointer for calibration. There is a crystal marker (calibrator) which transmits beats of 1 MHz, 100 kHz and 10 kHz. An Antenna Adjuster, an Audio Volume control, an RF Gain control, a BFO switch, a BFO Pitch control, two Mode switches, a dial light switch, an AFC switch for FM, a switch for the "S" meter and battery charge indicator, speaker and earphone jacks, two tone controls, the "S"/Battery meter, and an on and off switch allow control of the rig. There is also a selectivity switch which works on all bands except FM. On top of the cabinet are two long whip antennas: one for FM and the other for the SW and MB. There is a ferrite gyro antenna with a degree scale for directional AM and LW. On one side of the cabinet is the AC line connection and a jack for outboard 12 VDC source. On the rear are two sets of Ant/Gnd posts: one for FM alone. There is a battery compartment for 8 "D" cells and a compartment for the AC line and also a Phono/Rec jack and switch. Power source is 120 VAC 60 Hz, an outboard 12 VDC source or the 8 "D" cells. Audio output through a 5" Unicone speaker in the cabinet is 3000mW. The tone is pleasing and controlable. The cabinet has adjustable feet for leveling or tipping. Dimensions are 18½"W x 8"H x 6"D. Suggested dealer price is $299.00, but it can be purchased for less.

To tune SW signals (7235 kHz for example) set the Mode switch to the appropriate band, set both movable pointers (main SW dial and bandspread) to 0, set the bandspread dial to 0 and the main dial to the nearest 1 MHz mark (7000). Switch on the crystal marker to the pointer. The 1 MHz tone is louder than the 100 kHz marker enabling you to tell them apart. Now move the main dial to the nearest 100 kHz mark (7200) listening to the crystal marker weaker tone and readjust the pointer if required. Do not "null" the crystal beat; watch the "S" meter for greatest deflection. Now set

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- KENWOOD, ALL
- YAESU FT-101
- NATIONAL HRO-60
- ATLAS 180,210,215
- HEATH HW-12
- HAMMARLUND 170, 180
- HAMMARLUND SP-600
- YAESU FRG-7
- SWAN 350, 500
- TEN-TEC, ALL
- HEATH HW-16
- HEATH HW-100, 101
- REALISTIC DX-150, 160
- HEATH SB-102, 103
- COLLINS, ALL
- TEMPO ONE
- HEATH HR-1680

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COUNTS UP OR DOWN ANY IF OR VFO/PTO BETWEEN 100 KHZ. and 50 MHZ. USES MULTI-COLOR LED DISPLAYS(RED AND GREEN). SENSITIVITY BETTER THAN 5 mV. RMS AT 4.3 MHZ and 25 mV. AT 50 MHZ. DYNAMIC RANGE: 1000:1 XTAL CONTROL TIME BASE AT 2.4576 MHZ. ACCURACY: 10 HZ. TYPICAL. DISPLAYS: DIRECT READOUT, NOT MULTIPLEXED(LOW NOISE). POWER: 120 VAC., 8 WATTS. WEIGHT: 2.6 LBS. INPUT IMPEDANCE: 35 K-ohms CAPACITIVE COUPLED. VERY STABLE READING...NO LAGGING WHILE TUNING ACROSS THE BANDS.

New Power Line Voltage Monitor

Proudly announcing our new Voltage Monitor designed to give visual indication of true power line voltage and show voltage transients not detected by ordinary voltmeters. Valuable where knowledge of actual voltages is a must, such as computer systems, Ham radio equipment, portable applications and auxiliary Power is used.

Range-107 to 125 in increments of 2 VAC.50/60 Hz.
Resolution-1 VAC (2 LEDS on simultaneously)
Transient Response-333 usec max. Accuracy-2%
Consumption-250 mW; 120 VAC @ 2.1 ma
Dimensions-1.85 x 4.25 x 4.125 inches HWD 14 oz.
Display-107R, 109R, 111R, 113 to 123G, 125R Red/Green
Cost-$39.95 within USA. Ohioans add $1.80 sales tax

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the crystal marker to 10 kHz and reset the bandspread dial to the crystal beat and reset if necessary. Switch off the crystal marker and move the dial to 7235. If you have followed instructions, and the station is on the air, you will hear the signal just in time to miss the ID. Actually, the above process is not as complicated as written.

It will be noted that the dial markings are inaccurate to a greater or lesser degree, and the triple check crystal calibration is essential to obtain true frequencies. Actually, accurate dial markings for this tuning system would be practically impossible. It will also be noted that the Antenna Adjuster is very critical and must be set correctly for both tuning and calibration. Unfortunately, the same setting is not also correct for both tuning and calibration. It will also be noted that some SW bands are more sensitive than others. This can be corrected by the use of an amplifying preselector (I use a KS which is excellent). In fact, I would state categorically that this 8880 requires an amplifying preselector to bring it up to a competitive level with other receivers of this type.

Selectivity is quite good on the 'Narrow" position of the Bandwidth switch. I see no reason for the use of the 'Wide" setting as the tone or clarify does not seem to be affected. I would suggest that the RP-8880 is superior to the FRG-7000 or RF-4800 if one attenuates the antenna when working strong signals. The RF Gain control can also be used to increase selectivity.

Reception of SSB signals is superior. The BFO Pitch control is very effective. I will not report on the AM, LW and MB bands as I have no means of comparison. The AM seems adequate and sensitive, and the 'Narrow" setting seems to give good selectivity. The FM is nice to have and has an excellent tone. The receiver is not heavy and has a carrying handle as well as side handles for rack mount.

In conclusion, the RP-8880 seems to be a good value for its price. Negative features are the poor sensitivity without a preselector, the dial inaccuracies, the complicated calibration procedure and the limited coverage of the bandspread.

Evaluation Boo-Boo: I am very much ashamed that I made a bad mistake in my evaluation of the Sanyo RP-8880 in Bulletin 1. I discovered by accident that the poor sensitivity, and my consequent recommendation for the use of an amplified preselector, was caused by a factory defect in the receiver tested.

Last Sunday night, wishing to listen to the Otay repeater net on the 2 meter band, I fired up my 2/6/10 meter converter, which feeds a VHF signal to the antenna circuit of an SW receiver tuned to 7000 kHz. For convenience, I clipped the converter output to the whip antenna of the RP-8880. Later on, after the net program, I worked some SW on the Sanyo. I was amazed to find the weak sensitivity (reported in my evaluation) was no longer a problem. Checking it out I discovered that I had failed to disconnect the converter lead from the whip on the Sanyo. Further checking revealed that the exterior antenna binding post on the 8880, to which my outside antenna was connected, was improperly wired inside the receiver. The little things coming down from my antenna weren't going anywhere, and the increased sensitivity was caused by the whip connection left connected to the converter (which has its own antenna). A quick switch of my antenna lead from the binding post to the whip proved my complaint of poor sensitivity to be incorrect. I hope my error hasn't caused the Sanyo people to lose too many sales. It was their boo-boo, but I still feel like a fool and I apologize.

Sanyo RP-8880 Evaluation Vindicated: One of my first evaluations in the SDDXC Bulletins was of the Sanyo RP-8880. I found it a bit weird but obtained quite satisfactory results and so reported. The reaction was zilch, and I felt that many readers thought I was nuts. Now I find the receiver listed in the latest Heathkit catalog (Page 15) with the following: "Sanyo RP-8880 receives high marks from the Heath Co. Evaluation Dept." I feel better now.

Sony ICF-2001 Microcomputer Communications Receiver as illustrated on the inside back cover of the WRTH-80. The ICF-2001 is an exotic and radical departure from the accepted means of radio reception but of questionabout ability as its specifications avoid (?) mention of sensitivity and selectivity. Its companion receiver (the CRF-1) specifies both values in its literature. Your editor is anxiously awaiting a reception report, the date of US release and the price. The unit is selling in Japan for $206.00 which puts a possible US price of about $300.00 with the usual markup of about 50%.

The rather meager specifications supplied with the instruction manual are as follows:

Semiconductors: 1 LSI, 9 ICs, 11 FETs, 48 Transistors, 30 diodes (including 5 LEDs.)

Superheterodyne. Frequency Range: 76-108 MHz FM; 150-29999 kHz.

Antennas: Built-in AM/FM adjustable telescoping whip and a ferrite rod for 360-2143 kHz AM.

Speaker: Built-in 4" unit delivering 1200mW audio power. Jack for outboard optional timer. Recording and earphone jacks.

Power Requirements: 3 'D" cells for radio. Optional 120 VAC 60 Hz adaptor and an optional car battery adaptor. Computer: 2 AA batteries (separate from radio power). Consumption: 15 watts with AC adaptor. 9-10 hours continuous with radio batteries. One year for computer batteries.

Dimensions: 12¼ x 6¼ x 2¼ inches. Weight: 4 lbs.

Sensitivity, Selectivity, Image Rejection, etc.: Nil.

The receiver controls are unusual as there is no tuning dial. Control is accomplished with the computer in three methods: DIRECT tuning, MANUAL tuning and SCAN tuning. The only variable controls (in the form of thumb wheels and sliding switches) are the AM Antenna Adjustment (trimmer), the SSB/CW Compensator and the Bass, Treble and Volume control sliding switches. There is also a Band Switch (actually a mode switch), a power ON/OFF switch and an RF Gain Selector switch. Everything else is button-controlled. Computer buttons are 26 in number and consist of: 1 Sleep Timer button, 1 Light button (controls illumination of digital display), 10 Counter Buttons (0-9), 1 EXECUTE button (activates counter entry), 6 Memory Channel buttons (plus 2 for 8 total), Manual Tuning DOWN and UP buttons with a FAST button changing tuning from 1 kHz to 10 kHz steps, 1 ENTER button for Memory activiation, an L1 and L2 button to limit SCAN coverage to a certain band of frequencies and a START/STOP button for the SCAN operation. There is a novel Signal Strength Indicator in the form of 5 LEDs (the more lights the stronger the signal). Explanation of the use of these buttons follows:

Sleep Timer activated will turn off the receiver in 90 minutes (reduces by 10 minutes with each push of the button, and the duration is indicated in the frequency readout window).

Light button extinguishes readout illumination to save battery power.

10 Control buttons numbered 0-9 permit entrance of a frequency on the readout which is then activated with the EXECUTE button.

6 Memory buttons select channel to be used in memory storage or reading.

DOWN and UP buttons are for MANUAL tuning and increase or decrease the frequency shown on the readout in steps of 1 kHz or 10 kHz according to the position of the FAST button.

The ENTER button activates the Memory storage function or sets the L1 and L2 scan limits. The START/ STOP button controls the SCAN operation.

The switch marked BAND is actually a mode switch selecting either FM or AM (also SSB and CW). The SSB/ CW COMPENSATOR allows a 6 kHz override of the displayed frequency, up or down, permitting fine tuning of the SSB or CW signal.

Controls on the left side and rear of the cabinet are: Earphone jack, Recording Output Jack, Optional Timer input jack, computer battery compartment (note: instructions state both radio and computer batteries are required for operation, however, it further states radio batteries are disconnected with use of the AC adaptor ???) The computer batteries *are* required at all times and renewal will erase stored memories.

On the left side of the cabinet are located the external antenna terminals, the RF Gain selector with "DX," "Normal" and "Local" settings. This is an attenuator and permits attenuation of the RF as needed. When weak signals are being worked, the DX position is suggested. There is also a Scan Auto Stop switch controlling the SCAN function.

The three tuning methods are as follows:

DIRECT TUNING: Power switch to ON. Band switch to desired mode. Enter frequency on counter buttons (like on a typewriter except that a frequency with the three right hand digits all zeros, press only the first number(s) then the EXECUTE button). If you enter a frequency not obtainable within the receiver's coverage, a "TRY AGAIN" sign will flash in the display window. In this case, press the EXECUTE button and reenter the correct frequency. If the EXECUTE button is not pressed within 10 seconds after entry of the frequency, the display will return to the previous frequency. Adjust the volume. If tuning FM or SW, adjust the telescopic antenna. If tuning LW or MW, rotate the receiver to align the built-in ferrite rod antenna for optimum results or to subdue interference. If tuning SSB or CW, adjust SSB Compensator. This will not change the frequency readout. Adjust the Antenna Trimmer Readjust volume and set tone controls. Signal strength is indicated by the number of LEDs illuminated at the indicator. If the signal remains weak, check the setting of the RF gain switch. The DX position may be used at all times if overloading is not encountered.

MANUAL TUNING: Power switch to ON. Band switch to desired mode. Press the UP or DOWN button in the direction of the desired frequency. Frequencies will advance (or reduce) in either 1 kHz or 10 kHz steps according to the setting of the FAST button. Release the UP or DOWN button when the frequency is reached. Watching the LED signal strength indicator, again press UP or DOWN button for final adjustment. Further adjustments are now made with the whip antenna, Antenna Trimmer and the volume and tone controls. Reset RF Gain switch if required. As with DIRECT TUNING and SCANNING, the use of an outside antenna will increase the sensitivity of the receiver but will also increase possibilities of overloading and cross modulation. This can be controlled to a great extent by the use of the RF Gain selector (attenuator).

SCAN TUNING: Power switch to ON. Band switch to desired mode. Advance volume for a "live" sound. Set upper and lower limits of frequency band to be scanned as follows: (The 31 meter band, for example) Punch in 9500 kHz on the counter buttons. Press EXECUTE button. Frequency will be displayed by the digital readout. Then press the ENTER button and the L1 button. The figure "1" in a black arrow will appear in the display window indicating the lower scan limit has been entered. Now punch the frequency 9775 on the counter buttons. Press EXECUTE and then both ENTER and L2 buttons. The upper scan limit is not inputted and the number "2" in a reverse black arrow will appear in the display window. Check your scan limit entries by pressing first the L1 and then the L2 buttons. The limits will be displayed. If you wish to use the Automatic Scanning feature set the Scan Auto Stop switch (on the right side of the cabinet) to ON. Now push the START/STOP button. The receiver will begin to scan up from the lower limit. When the upper limit is reached it will return to the lower and scan again. With the Auto Stop switched to ON, scanning will stop automatically when a signal is encountered and will not resume scanning until the START/STOP button is again pressed. Further tune or adjust your signal as with MANUAL or DIRECT tuning, pressing the UP or DOWN buttons, watching the signal strength indicator. Further adjust the antenna, Antenna Trimmer, RF Gain, volume and tone controls. Scanning will proceed in 0.1 MHz steps on FM and 3 kHz steps on AM. Automatic scanning may stop slightly off frequency due to the odd scanning steps. This must be "fine tuned" with the UP or DOWN button set to the 1 kHz tuning rate. As with the above tuning methods, an outside antenna is recommended for optimum results.

MEMORY PRESET and PRESET TUNING: Power switch to ON. Band switch to proper mode. Tune to desired station with any tuning method. To enter this frequency into the memory bank, hold down the ENTER button and press one of the Memory buttons numbered 1 to 6. After a memory channel has been preset, it will be so indicated in the display window. If you preset #1 and #2 to FM stations, that will be indicated in the display window. If you preset #1 and #2 to FM stations, that will be indicated *only* when the band switch is set to FM mode. The memory channels preset to AM frequencies (LW, MW or SW) will be indicated in the display window when the mode is set to AM. Both the L1 and L2 buttons can be used as memory channels giving an 8 frequency memory capacity. To check the presetting of a frequency, tune to another frequency manually then push the Memory button just preset, being sure the band switch is correctly set.

All this is very interesting, exciting and a radical change from the norm. However, if the receiver lacks sensitivity or selectivity all this gold will not glitter. It is, however, a very definite and positive indication of the way the hobby wind is blowing. We are entering the age of the computer, and soon even our body functions will be computerized. Not too long from now we may have a computerized robot for President (I hope) and if he (it) can function with only 2 AA batteries, I'm all for it.

Sony CRF-320: This is a dual conversion deluxe portable with digital readout and everything but a steam whistle which sells for $1,695.00. It can be had for as much as $500 less from the NYC discount houses. I have not heard any glowing reports. In fact, someone gave it just a "fair" rating.

The Sony CRF-1 Communications Receiver is illustrated on the inside back cover of the WRTH-80. Sony apparently spared no effort to build an excellent receiver using the latest circuitry and sophisticated components. Nothing radical or exotic is offered but some refinements are included. It is unfortunate that this receiver may never reach our shores as the stateside Sony offices state both the Sony ICF-2001 and CRF-1 may never be made available here. Grant Manning is of the opunion that the level of microwave radiation in the two receivers may exceed the FCC regulations.

A general description is: All band coverage from 10 kHz to 30 MHz. Accurate tuning is achieved with the dual conversion superheterodyne circuit and an up-conversion system using a monolithic crystal filter in the first IF stage. Single knob tuning performs spectrum selection and fine tuning. There are two displays: a digital frequency readout and an analog dial. An LSI circuit in the PLL synthesizer eliminates band selection. An 8 band pass filter in the RF and the preselector reduces interference. Stable SSB/CW/ECSS reception is assured by the use of quartz crystals in the BFO circuit. Three selectivity modes: 10 kHz and 4.4 kHz for AM; and 2.0 kHz for SSB/ECSS/CW. Noise blanker switch. Portable with a handle and a telescopic antenna. Powered by house current or 12 VDC car battery.

Controls and functions: Compartment for AC power adaptor and cord and for 8 "D" cells. Compartment for backup battery to power the memory circuit when receiver is not in use. Digital frequency display in kHz with tuning knob pulled to "out" position and to the 100 Hz setting with the knob "in." Usual volume control and RF gain in a double knob. Dial light and other scales darkened with switch for battery economy. Button to check battery condition. Button to display frequency when tuning knob "in" and fine tuning. Mode selector buttons: AM Wide, AM Narrow, USB, LSB and CW. Tuning knob in the "out" position tunes MHz. In the "in" position tunes kHz to 100 Hz. Red light indicates correct tuning. Noise blanker to supress ignition noise, thunder etc. Preselector switch with indicator scale in the "in" position for optimum sensitivity. (Always use with the whip antenna.) The "out" position is an attenuator and disengages the preselector. Combination signal strength and battery condition meter. Preselector control should be set according to antenna in use and the strength of the signal.

Additional aids are: front panel headphone jack and on/off switch. Rear panel supplies cord clamps, BNC antenna coupling, external antenna terminals, mute input jack, recording output jack, external speaker jack and external power input jack (12 VDC). Note: When the mode switch is set to SSB or USB, the frequency readout will be adjusted automatically to read correctly. The battery-operated "memory" feature permits the user to preset the frequency for timer operation permitting recording of a program when the operator is not present. This cannot be done with the Drake R-7 unless the AUX-7 option is used.

Specifications: Dual conversion superheterodyne. 21 ICs, 21 FETs, 60 transistors, 99 diodes (including 12 LEDs). Range: 10 kHz to 30 MHz. Modes: AM (wide and narrow), USB, LSB and CW. IF frequencies: 55.845 MHz and 455 kHz. Sensitivity: 10 to 50 kHz 30dB on AM, 20dB on SSB; 50 kHz to 30 MHZ 0dB on AM and -10dB on SSB. Selectivity: Wide AM at -6dB 10 kHz; at -60dB

16 kHz (shape 1.6 to 1). Narrow AM at -6dB 4.4 kHz; at -60dB 8.0 kHz (shape 1.8 to 1); SSB and ECSS at -6dB 2.0 kHz; at -60dB 3.4 kHz (shape 1.7 to 1). Image rejection: 1st: 100dB at 10 MHz; 2nd: 90dB at 10 MHz. IF rejection: 90dB at 10 MHz. Antenna: 50-75 ohms. Speaker 4", handling 1.2 watts. Battery life: 6 hours with 8 heavy duty "D" cells. Memory battery: 2 AA cells, 1 yr. Dimsensions: 10-1/8 x 4 x 13-1/8 inches WHD. Weight: 14 lbs. 9 oz.

A straight-forward receiver with the most advanced circuitry and superior specifications. All receiving controls are anticipated and intelligently anticipated with ample controls. Monocoque diecast aluminum chasis for high electronic and mechanical reliability and protection for delicate components. Unfortunately, its availability and price in the US is not established yet. It sells in Japan for about $1,000.00, so a US price could be about $1,500.00.

Sony CRF-1: I obtained the information for my description of this receiver from a translation of a Japanese brochure. Today I received brochures on both the CRF-1 and ICF-2001 in English. I find that my translator had missed several important facts:

First, the main tuning knob, when pulled out, tunes the MHz from 0.1 to 30 in 8 revolutions, indicating the frequency and segment of the spectrum on a receiver-width slide rule analog scale at the top of the panel while advancing the digital MHz reading. Pushed in, the same knob fine tunes the kHz portion of the frequency to 100 Hz on the digital readout display. A red LED indicator close to the knob lights up when the signal is stabilized and locked on.

Full specifications of the IF bandwidths are: Wide 10/16 kHz at -6dB/-60dB; Narrow 4.4/8 kHz at -6dB/-60dB; SSB and CW 2.0/3.4 kHz at -6dB/-60dB. Shape factors are 1.6, 1.8 and 1.7 to 1, respectively. All filters can be used in any mode.

The AC adaptor furnished with the receiver is detachable and can be replaced with a battery pack of 8 "D" cells.

A built-in telescopic antenna and speaker, plus a combination handle and tilt stand, facilitates portability.

The incoming signal is controlled in a sophisticated manner with a preselector consisting of a 4-gang variable capacitor and a 2-gang micro tuning coil. This circuit has its own analog readout, and each of the four preselector circuits has its own RF amplifier for the rejection of intermodulation, cross modulation and spurious signals. Other specifications indicate the high quality and sophistication of the design.

Sony ICF-7600 Multiband Mini-Portable: Jack Kaeck in the June issue of Glenn Hauser's RIB reports that Sony has brought out a pocket-sized (overcoat only) AM/FM/SW radio for travelers. It has 7 bands: FM (76-108 MHz, extended for European frequencies), AM, and 5 SW bands (19, 25, 31, 49 and 75 meters). (Why 75 instead of 16?)

It is compact, being 1¼ x 4½ x 7 inches and weighs 1.4 lbs. Power is 4 enclosed AA cells or external 6 VDC. Has a 24" whip antenna for SW and FM and a ferrite loop for AM. Suprisingly, it has a 3" speaker with good tone. The slide-rule dial has bandspread type scale on the SW bands and is quite accurate. There is a 3 position bandspread control. Because of the very limited space, single conversion is used, and image rejection is rather poor. Sony claims -13dB. The author was amazed to find signal strength and selectivity to almost equal his ICF-5900.

The set sells for $160.00 and is not yet available from the NYC discounters. An ideal receiver for someone on the move who wants his SW for program listening but not adequate for DXing. (P.S. Bob Foxworth in the July RIB reports the ICF-7600 available from 47th St. Photo for $120.00. Also complains of images. G. Sherman advises 75 meters is important in Japan. Batteries last about 80 hours.

Sony ICF-S5W: SDDXC member Armand DiFilippo of PA alerts fellow afficionados to a hot MW portable (with FM) which, to date, has only been available in NYC. It has an unusual feature of 10 different dial scales marked with call letters of major stations in the 48 states. Equipped with hot FET front end and RF amplification with a 4 element ceramic IF filter for selectivity. Reception of weak, hard to get stations and clean, clear signals is possible even in crowded

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bands. Boasts an oversized ferrite rod built-in antenna but has terminals for outside antenna. Has a DX/Local switch to avoid overload from neighboring transmitters. LED indicators help in accurate tuning, a vernier tuner, carrying strap, highly sensitive FM section, good 4" speaker and a 3-way power source (operates from 3 "C" cells, the auto lighter socket or 120 VAC 50/60 Hz). Size: 6-3/4 x 8-13/16 x 2-5/16 inches HWD at 2 lbs. 9 oz. List price: $74.95. Unavailable except in NY. 47th St. Photo quotes $58.50 plus shipping and handling (approximately $10) so savings not worth the chance of delay or foul-up. I suggest your local dealer can offer you better service and attention. Sony agency promises supply soon. I have purchased one and will report performance in upcoming Bulletin.

Sony ICF-2001 Microcomputer Portable: For some time I have been anxious to obtain one of the new rigs for testing. Sandy Blaize of SPEEDX Technical Topics has beat me to it with a very interesting evaluation in the August issue. Although I would like to give you the entire report, I will limit myself to the highlights and suggest you send $1 to SPEEDX for a copy of the bulletin.

This is an unusual receiver in that the usual knobs and dials are missing. Tuning is accomplished with push buttons. A desired frequency is punched in on a keyboard arranged like a calculator, or you can scan up or down (2 speeds) to the frequency. An LCD digital readout registers your every move as well as displaying other information. Punching the SLEEP button produces the word "Sleep" and the remaining minutes on the display. If you make a boo-boo on the keyboard, the display warns, "TRY AGAIN." They forgot the clock.

Full coverage of 150 kHz to 30 MHz and 76 to 108 MHz FM. A feature is a memory bank of 6 plus 2 channels into which you may store 8 frequencies from the display (both AM and FM). Handy for instant comparison of parallels, setting up a group of frequencies for quick capture of IDs on the hour, setting for time clock taping during your absence or sleep hours and for storage of frequently used signals for instant recall. Memory is held by 2 AA cells.

Sandy comments that this rig is ideal for a blind person, requiring only familiarity with the keyboard to set up frequencies without reference to the display. Sandy closes his review with, "Although the receiver has short-comings, I like it very much."

Yaesu Musen FRG-7700: Early reports of this receiver, not yet available in the US, liken it to the Kenwood R-1000 instead of the FRG-7 or FRG-7000. This description is gleaned from an article by Dave Newkirk in the September FRENDX and from information supplied by Grant Manning of Radio WEst, who is taking advance orders.

Circuit is described as phase locked loop up-conversion with 48 MHz in the 1st IF with a 7 band-pass filter front end for overload control. Coverage is the usual 150 kHz to 30 MHz with modes marked as AM, FM, USB, LSB and CW. The band control is a dial tuning in steps of 1 MHz similar to the R-1000 and NRD-515. The kHz tuner varies from 40 to 80 kHz per revolution. No vernier tuning except for the frequencies in the memory (required for off band or drifted frequencies). There is no preselector or antenna tuner. Orange LED digital frequency readout to 1 kHz, analog tuning in 10 kHz increments. The selectivity choice is 2.7, 6 and 13 kHz for AM, SSB and CW. FM is narrow-band at 15 kHz selectivity permitting good control in VHF/UHF bands with a converter. Shape factors are not readily determined as upper dB figures are given variously as -50, -60 and -40. A rough estimate doesn't indicate superior shape. Sensitivity is claimed to be: 30μV/AM and 3μV/SSB-CW at .15 to .3 MHz; 25μV/AM and 2μV/SSB-CW at .3 to 2 MHz; and 5μV/AM and 1μV/SSB-CW at 2 to 30 MHz.

Additional features are: 12 hour AM/PM crystal controlled clock (somebody goofed) which displays time on digital readout and can be used for "absentee" DXing (timer preset frequency taping while you sleep which is not possible with either R-7/DR-7 or NRD-515 except with memory unit attached). Has a Noise Blanker (not a noise limiter like FRG-7 and FRG-7000), a Squelch control (new to SW rigs but nice), fast and slow AGC, Mute switch (for transmitter use), RF Attenuator (a bass-akward gain control), built-in speaker and outboard jack with 1.5 watts. Power requirements: 110/220 VAC 50/60 Hz with optional DC power kit available. Nice appearance without FRG-7000 Christmas tree lights. Size and weight normal.

A 12 channel Memory Unit is optional, and stored frequencies can be injeted in the receiver without setting the band switch, are displayed on the LED readout and can be fine tuned.

The FRG-7700 is designed for both the SWL and the Ham, as the Ham bands are marked on the MHz dial. This is further indicated by the narrow band FM, as mentioned before. Dave Newkirk assumes the rig to be capable of RTTY although the mode is not marked. Any receiver will tune RTTY if it can hold still long enough. Stability is not mentioned.

The price is $715.00 with the Memory option; $559, without. Delivery is "soon" ?? Radio West is taking all orders.

Yaesu FRG-7700: This new receiver looks like a winner. It is not an update of either the FRG-7 or FRG-7000, being very similar to the Kenwood R-1000 but with more gizmos to twiddle. It uses the same tuning system with a 29 step MHz dial and a main control for the kHz with 10 kHz divisions covering 1000 kHz. The digital display, immediately above the main control knob, reads to 1 kHz with 5 figures. A fine tune knob allows final adjustment of a frequency recovered from the memory bank and also serves as an FM squelch control. The optional memory bank permits storage of 12 frequencies from any mode including FM which can be activated by a switch on the front panel without the need to reset the band switch. An all-purpose 12 hour AM/PM clock permits absentee taping and a "sleep" function. The hours are displayed on the digital readout.

The mode switch includes 3 AM bandwidths with USB, LSB, CW and FM. Push buttons control fast and slow AGC, on and off Noise Blanker, a timer controlling receiver on/off as well as power source for external equipment (tape recorder, etc.), a dimmer for dial and meter lights, memory functions, and the clock functions. An RF gain control is marked "Atenuator" and is for overload control. Both 'phone and record jacks are on the front panel. The meter is marked as a true "S" unit.

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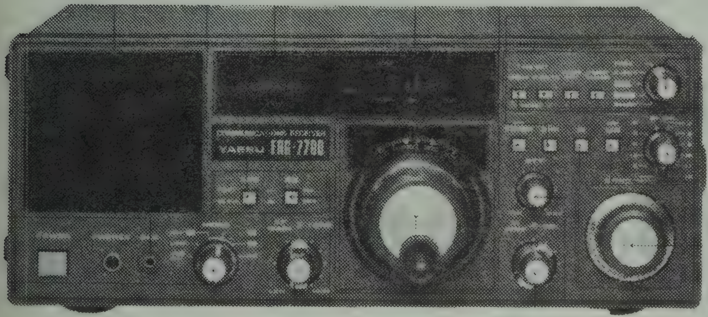

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The panel layout is both attractive and practical with controls arranged intelligently. If it works as good as it looks, we should have a very respectable receiver.

Specs are good with 150-29999 kHz plus FM coverage. Modes: AM, LSB/CW, USB and FM. Sensitivity on AM: 30/25/5µV; on SSB/CW 3/2/.5µV at .05-.3/.3-2/2-30 MHz. Selectivity is AMW/12, AMM/6, AMN/2.7 kHz SSB/CW/2.7, FM/15. Shape factor fair. Stability less than 300 Hz after 30 minute warm-up. SW antenna impedence: 50 ohms unbalanced. Audio 1.5 watts to front-facing built-in 8 ohm speaker. Power: 110/120/220/240 VAC at 50/60 Hz. Size: 334/129/225 WHD at 6 kilos. Factory suggested price is $559, with memory option its $715. (Radio West is quoting $500/$630.)

Evaluation of the FRG-7700 Yaesu General Coverage Reiver: (Also to include expansion of memory to 256 on FRG-7700 and NRD-515 to 64 memory. By Robert Lonn, 1162 Melrose Ave., Chula Vista, CA 92011.)

As a Ham radio operator for 3 years (WA6PHN) and a SWL for over 15 years, I felt it was time to upgrade my present radios to all solid state and to include digital readout.

My choice was the new Yaesu FRG-7700 with digital memory option to include 12 memories. After 3 weeks of operation, I feel I can say that this radio was well-designed and will provide all modes of operation, including control via a central computer system, to select any SW station you may want at the push of a button.

A front facing speaker is provided which provides excellent tone quality. An "S" meter is provided, and even very strong signals could not cause the meter to be pegged and that is the way it should be for accurate logging.

Digital readout is provided with 1 kHz resolution. A check against WWV showed the counter to be right on frequency. An analog dial with 10 kHz marks is also provided. Tuning is velvet smooth. They may have used the same mechanism used in my new FT-107M Yaesu Ham Receiver. No backlash was noticed with this radio.

A 24 hour timer is provided to turn the radio on and off at selected times, and a relay closure is provided to start and stop a tape recorder. A 59 minute sleep timer is included for that before-bed relax time. The clock is a 12 hour format with AM and PM indications. A 24 hour format would have been preferred. All of these features work very well and I see little room for improvement.

Now to the heart of the radio: An all function Noise Blanker is provided and does a good job with noise pulses and will even provide 30% reduction on the woodpecker. The AGC circuit provides both fast and slow action and works very well. The true test of this was on SSB signals with an excellent fast attack and slow decay for crisp clear signal SSB! A variable attenuator is provided for up to 50dB of rejection. I have a friend who is a ham and lives 3 blocks from me. With his 1K linear and with the beam aimed right me, *no* overload was experienced. I am sure you probably will never need to use the attenuator! A tone control is supplied with high frequency cut above 2.1 kHz which reduces het pitch very well. The squelch control, used on the FM position, works excellently. I compared it to both of my 2 meter Ham radios and found it took only .53µV to break squelch. You won't miss any 10 meter FM calls from overseas with this radio.

Ham radio operators have demanded high quality from Ham receiver manufactuers, and I feel Yaesu built this radio with us in mind. USB/LS 13-CW, AM-W, AM-M, AM-N and FM is provided. AM-W is used on local AM stations for best fidelity. AM-M is used for most SW stations. I measured the shape factor of the entire receiver. Filters are provided for both the *up* conversion and *down* conversion IF prior to the final 455 W-M and N band pass. We found the Wide and Narrow to be close to specs but found the total shape factor of 6 kHz Medium to be closer to 5 kHz at -6dB and 11 kHz at -60 dB. A 40dB signal from Radio Moscow would not affect a 2 "S" unit signal 5 kHz away. Could you ask for more from factory stock filters?

Three antenna inputs are provided on the back: PL-259 adapter, long wire and a separate antenna input for the 150 kHz through 1200 kHz band. Also, a mute connection is there to shut down the receiver if you have a transmitter in the shack like me. Band switching is done automatically. A dial from 0 to 29, in steps of 1 MHz, is provided as well as a separate scale for 180 through 10 meter Ham bands including the all-new WARC bands.

An optional 12 channel memory is offered. This memory controls all aspects of the radio. It changes bands for you as well as selects proper input filters. This is done since all information in the receiver is converted to digital and then stored in memory. A memory fine tuning control is provided for 500 Hz shift of the memory frequency. The radio is capable of 256 memories. The unit is only limited by the switch on the front panel. I already have a remote box with 3 thumbwheel switches on it, so all you have to do is dial up "143" and memory 143 is recalled. I will be offering this unit to all members in the near future. Write me for details if you wish.

Since a computer works with digital, I will soon have a program written so if I put, let's say, the BBC on the screen and hit "run," it will check the internal clock, check for the best frequency for that time and turn the radio on and set the frequency to the right band and number. What more could you ask for?

The NRD-515 is capable of 64 memories, and I will have a similar external thumbwheel switch for it. The Computer Age is here and the FRG-7700 and NRD-515 are ready to go! I feel the FRG-7700 was well-designed and will provide excellent reception of all modes of communication and lives up to, or exceeds, all manufacturer's specifications.

FRG-7 vs. FRG-7000: Ever since the FRG-7000 was introduced, I have been under the impression that the 7000 was only a gussied-up version of the FRG-7 with identical performance, more Christmas tree lights, a digital frequency readout and a digital clock, but I have never been able to state this categorically. When I learned that Mike Hardester had both receivers, I jumped at the chance to verify my suspicion.

In my query, Mike wrote, "The only difference that I am aware of is the digital frequency readout, the digital 24 hour clock and a LW band of 250-500 kHz."

One thing that Mike didn't mention is that the FRG-7000 has a 2.9 kHz filter in the SSB mode which can be adapted for use in the AM mode. (see Page 6, Bulletin

10.) Radio West charges $40.00 to make this adaptation, while they charge $100.00 for the installation of a Collins mechanical filter. The latter does a better job, but the adaptation improves the receiver considerably (selectivity-wise). As both the FRG-7 and the modifications required to upgrade it to the FRG-7000 have various prices, you need to know the whole picture. There is a basic difference of $285.00 between the publish list prices of the two receivers.

Radio West quotes $340.00, and in regular stores it costs $370.00. A digital readout is from $120.00 for the Torrestronics to $150 for the 4 digit counter from Radio West. A digital clock from West is $40.00. One advertised in the trade magazines is $29.95, and a repainted flip-card digital 24 hour clock costs only $5.95 if you do the repainting (see Bulletin 14). If one must have the 250-500 kHz band (of small value except in Japan and Europe), a Palomar adapter costs $55.00.

If you want selectivity modifications for the FRG-7, your cost will be approximately $60 for a ceramic filter from Gilfer, $70 for a surplus Collins mechanical filter from John Kolb or $90 for a new Collins from Radio West. A selectivity modification for the FRG-7000 is $40 for the adaptation and $100 for a Collins, both from Radio West. Installation of a surplus military Collins by John Kolb will run about $20 less.

Although the Torrestronics Digital Frequency Readout is cheaper than Radio West's, it requires installation. The factory supplies full instructions, but if you don't know your way around the insides of a modern receiver it had best be done by a good technician. Another consideration is that any receiver modification voids the warranty. However, purchasing a modified receiver from a reliable concern such as Radio West carries the firm's warranty.

So, you have a choice of an unmodified FRG-7 with a Torrestronics Readout for $400.00 (Sears model) or a Radio West package for $490.00 (warranted) as against a Radio West FRG-7000 with the frequency adaptation for $600.00. A modified FRG-7 with a digital readout can be had for as low as $460.00, using all the angles, to about $570.00 for a Radio West Package, with John Kolb's filter in a Sears receiver for $470.00 and Yaesu for $510.00 as against the FRG-7000 adapted by Radio West for $600.00 to the fulltreatment (Collins mechanical filter) at $700.00.

I am not familiar with the ceramic filter modification by Gilfer but have a gut feeling that the Collins is superior. The surplus filters installed by Kolb are obtained from canniablized military equipment and have been thoroughly tested. Some of them were never used, and many have better shape factors than commercial units.

FRG-7000: In the March FRENDX, Jerry Lineback gives a very comprehensive evaluation of the Yaesu FRG-7000 and compares it with a Drake SPR-4, a Panasonic RF-2800 and a Hammarlund SP-400X, using several antennas and real-life situations. Jerry categorically labels the unmodified FRG-7000 was a turkey but gives the same receiver (with selectivity modifications) a rating second only to the SPR-4.

Some of the more succulent remarks (together with some embellishment by yours truly) regarding the unmodified FRG-7000 follow:

Built-in digital clock's flashing seconds so close to the frequency display is very annoying. If you disconnect the receiver from the AC, you have to reset the clock. The clock also prohibits use of battery power.

The "S" meter is unrealistic and exceeds 20dB with just background noise.

Twenty-five colored lights (including the LED) lend a festive atmosphere and remind one of sleigh bells and mistletoe.

A selectivity shape factor of 3-1 explains why strong signals spread out like Mrs. O'Reilly's derriere and makes the FRG-7000 an expensive doorstop for those DXers wishing for something more than VOA, DW and BBC.

It all adds up to the fact that the Super FROG, as it comes off the shelf, doesn't stand a chance against such receivers as used by Mr. Lineback in his comparison. Fortunately, certain modifications change the picture dramatically and results give a high score in things that count.

Tests of all four receivers for attenuation, station separation, weak signals in strong company, signals closer than 5 kHz, sensitivity, selectivity, stability and tone quality fail to down-grade the modified FRG-7000.

I take issue with Jerry's classification of the SPR-4's audio being "very good." I think it is lousy. That is why I sold mine.

Not as a rebuttal to Mr. Lineback's article, but as an observation I would like to remind the reader that an FRG-7 with the same modification, plus an outboard digital readout (sans clock and Christmas tree lights) will give the exact same results as the modified FRG-7000 and for a lot less money. See article on FRG-7 modification in Bulletin 9 and FRG-7000 modification in Bulletin 10.

FRG-7000 Modification: The February FRENDX has an article by Robert Rankin on a simple method of improving the selectivity of the FRG-7000 by utilizing the 3 kHz SSB filter for the AM mode. It seems that this modification is quite simple as both the AM and SSB filters have a common chassis ground and can be switched from one to the other with a SPDT toggle switch. This can replace the recording jack on the front panel (which should be on the back anyway). The filter wires, white with blue stripe and white with brown stripe, are soldered to the Mode switch. It is best to trace these for a double check. They extend with a cluster to the filter portion of the PC board. Unsolder these two wires from the Mode switch (using a low watt iron) and extend them to the toggle switch (miniature) location. Run a wire from the middle contact of the toggle switch to a chassis ground, and solder your two extended wires to the outside contacts of the switch. Now, reinstall the recording jack on the rear panel. You will find that the audio on the narrower filter will be poor (reason why Yaesu didn't do it) but you will be able to extract an otherwise clobbered signal from a busy spot on the band. Rankin makes a very good suggestion in that if you have the dealer from whom you purchased the set do the modification, it will not affect your warranty.

Yaesu FRG-7: When these receivers first appeared on the market I purchased one only to sell it because of the mediocre selectivity and my inability to accurately read the frequency. I wish now that I had kept it and had it modified. I took my new Dymek DR-55 to John Kolb for the installation of what is needed for coupling to my Torrestronics digital readout. John was kind enough to loan me his modified FROG to use temporily. He had added a 2.7 kHz Collins filter for better selectivity, and I can report that this modification has changed a mediocre receiver into a top notch piece of gear. It still has the crowded tuning dial (10 kHz markers), but with a crystal calibrator one can identify, to within a kHz or 2, the frequency to which you are tuned. The best answer would be a digital readout if one insists upon using the receiver instead of the WRTH to read the frequency to a kHz.

Until I get a chance to check out the Realistic DX-300 (due in about 2 weeks), I shall insist that the modified FRG-7 is the best available rig under $500. Radio West can deliver a brand new FROG with the Collins filter and a digital readout for $558. This figure can be reduced by purchasing a used FRG-7, a Torrestronics readout and a John Kolb-installed filter to, say, $445.

FRG-7 Overload Control: The FROG front panel has an attenuator control marked DX-NORM-LOC. Frequently, one of these settings is either too much or too little. A simple modification is possible wtih a 20K ohm potentiometer. Center lug to the Mute terminal on the rear of the receiver with the right hand (front view) lug to ground. Mount with a small bracket to the front side with a cover screw. This will give you full control for attenuation of overload. Thanks to Grant Manning, Bob Rankin in FRENDX and to Syd Osterman in RBI.

Zenith Trans-Oceanic R-7000 Portable: Thanks to member Steve Sluka I have some information on this new receiver. Unfortunately, ten pages of description does not include important specifications. However, we can obtain a fair idea by reading between the lines. It is obviously an improvement over the previous model.

The circuit is the usual dual conversion superhet but with contemporary refinements such as up-conversion mixer, crystal and ceramic IF filters, dual gate MOS FET front end, crystal-controlled BFO and SSB detector, balanced IF mixers for image rejection, diode switching, etc. The size and shape of the IF filters is not given nor is a sensitivity factor specified. There is no choice of bandwidths (selectivity). There is a dial light switch for battery use.

It has both pluses and minuses: A plus being exceptional coverage (LW, AM, FM 7 SW bands, Aircraft and Public Service ((VHF)). A minus is that the bandspread is only on the CB portion of the SW band 7. Fine tuning is done with a two speed main dial. A plus is 7 SW bands giving a pseudo-bandspread effect with uncrowded frequency spread. A big minus is the failure to supply a digital readout. Another minus is a single switch for the BFO/SSB mode without USB and LSB selection. The lack of a pitch control for the BFO is also a minus. I imagine ECSS tuning to be tight. A plus is a squelch control for all bands except FM, a nice feature. A minus is poor frequency readout without bandspreads. A plus is an RF Gain control, a switch for ANL on 11 bands and for AFC on FM. Another plus is 1.9 watts of audio with a 5" speaker with rotary tone control. The phone jack accepts both mono and stereo phones (needed on all receivers). The tuning meter for FM is a plus, but the price of $379.95 (which is only $20.00 less than the Kenwood R-1000 which has none of the above minuses. (($445.00 with RW modifications)) is a minus.

The bottom line, of course, depends upon performance. However, it is a nicely-packaged unit with refinements such as a world time chart with adjusting dial, a rotary azimuth disc for navigation with an optional swivel base, a handy operating guide in the front cover, two built-in antennae, a telescoping whip for FM, SW and VHF and a ferrite rod loop for AM/LW. Operates with 8 "D" cells, a 12 VDC source, or 120/240 VAC 50/60 Hz. Size is 9.38 x 14.06 x 5.56 inches HWD. Weight: about 14 lbs. with batteries.

Exciting News for the Blind: Ten Tec Inc. of Sevierville, TN is offering a Model 299 Talking Counter for $290.00. This is a synthesized speech readout enabling blind hobbyists to tune receivers with the same or better accuracy as visual tuning.

It will work with any receiver, being connected to the VFO output. It is a self-contained frequency counter, speed synthesizer and audio amplifier with speaker. It allows a blind person to "hear" the frequency down to 100 Hz. The accuracy is greater than an analog display, and an LED visual readout is furnished as an option. Operates from 12 VDC. Covers entire SW spectrum. Produces well-modulated male voice with quality adjustment. Address of the manufacturer is not given in the literature, so inquiries may be addressed to just Ten Tec Inc., Sevierville, TN 37862. The heart of the 299 device is a speech synthesizer module for a talking calculator manufactured by Telesensory Systems, Inc., PO Box 10099, Palo Alto, CA 94304. This module sells for less than $100.00, and TSI furnishes instructions and diagrams for the manufacture of the above type of device.

Barlow Wadley XCR-30: It is rumored that Barlow Wadley in South Africa has gone out of business. RSA receives the SDDXC Bulletin. How about a note regarding this firm? XCR-30 owners can obtain expert service from Bayoutronics, 417 Ridgewood Dr., Metairie, LA 70001. I just learned that Wadley of BW is an ex-engineer from Racal in England.

The Super Marker is an inexpensive crystal marker (calibrator) and is diagrammed and described in the March Popular Electronics (P. 74). It has a selectable output of 100, 50, 20 and 10 kHz. The parts come to about $15.

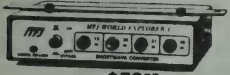
Preselectors: Appearing in the April SPEEDX is an article by Steve Kennedy on receiver preselectors which has enlarged my understanding of these very useful devices.

I have owned and used a KS Preselector several years and use it constantly, even to boost the performance of my Drake R-7/DR-7 (sacrilege, you say?) It never dawned on me to note that the KS was more effective on single conversion heterodyne rigs like the DX-160 (and the new DX-200) and on certain frequencies. Steve's article points this out.

Earlier models of so-called preselectors were simple broadband preamplifiers. Later came tunable RF amplifiers. A true preselector has tuned circuits on the inputs and outputs of an RF amplifier and is selective enough to pass only those frequencies it is tuned to.

A preselector operating with a receiver needs to be retuned every time the receiver changes frequency more

NEW MFJ 4 & 8-Band Mobile Shortwave Converters



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Two models to choose from. The 4-band "World Explorer I" (MFJ-304) offers complete *19, 25, 31 and 49 meter coverage* (the most popular HF bands due to their distance capabilities at various times of the day and year). Hear countries from Europe, Africa, Middle East, Asia, the Islands, North and South America. The 8-band "World Explorer II" (MFJ-308 adds *13, 16, 41, and 60 meter* bands for even greater listening variety.

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Easy to use, easy to install. Push a converter button to choose the band, tune in stations with your regular car radio. To install, just plug the car antenna into the converter and insert the converter cable into your car radio antenna jack; connect the power lead to 12 VDC.

Listen to the world on the road. Get the new MFJ mobile SWL converters — "World Explorers I & II."

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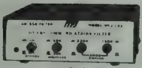

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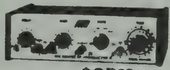
10-pole (5-stage) circuit with *Chebyshev superfast roll-off* (up to 58 dB/octave). First button: On/Off-Bypass, response 300-3000 Hz; second: 500 Hz lower cutoff; third: 2200 Hz upper cutoff; fourth: 1500 Hz upper cutoff. *Built-in speaker*, 2 watt amplifier, LED, 9-18 VDC or 110VAC with optional AC adapter ($7.95+$2). 5x6x1⅝".

NEW MFJ Preselectors



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Multiplies signal strength by ten times! 20 dB low noise MOSFET amplifier.

Built-in 20 dB attenuator *prevents receiver overload* from strong nearby stations.

Works with 2 antennas and 2 receivers at the same time! Complete controls, LED indicator, Auto-Bypass For Xcvrs, PTT; requires 9-18 VDC or 110 VAC with optional AC adapter ($7.95+$2). 8x2x6"

Model MFJ-1045, $69.95 +$4, 5x2x6" similar less attn., auto. bypass, 1 ant., 1 rcvr.

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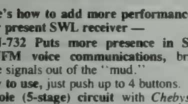
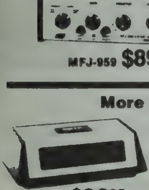


MFJ-959 $89.95 (+$4)

MFJ-959 matches antenna to receiver *for maximum signal strength.* **Covers 1.6 to 30 MHz.** Low noise 20 dB preamp. Can use 2 ants. and 2 rcvrs. 20 dB attenuator. 9-18 VDC or 110 VAC with optional AC adapter ($7.95+$2). 9x2x6" **MFJ-950, $59.95 +$4** similar, less preamp, attenuator, bypass.

More MFJ Listening Post Favorites



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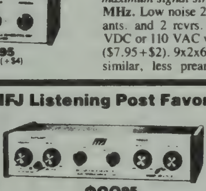
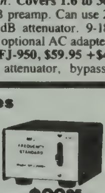


MFJ-752B $89.95 (+$4)



MFJ-200BX $29.95 (+$4)

NEW 12/24 Hour Digital Clock/ID Timer Switch from 12 hr. to GMT, to "seconds" readout, ID timer or elapsed timer. WWV sync, solid-state, blue 0.6" digits, reg. alarm + indicators. 110 VAC, 60 Hz, 6x2x3".

MFJ-752B Dual Tunable SSB/CW Filter. Primary filter lets you peak, notch, low pass or high pass with extra steep skirts. Aux. filter has 70 dB notch, 40 Hz peak. Both tune 300-3000 Hz, variable bandwidth. Noise limiter. Inputs for 2 rcvrs. 2 watts for speaker. 9-18 VDC, 300 mA or 110 VAC with optional adapter ($7.95 + $2); 10x2x6". **MFJ-751, $69.95 +$4** similar less Aux. filter, hi-pass & limiter. 5x2x6".

MFJ-200BX Frequency Standard. 100, 50, or 25 kHz, pulsed for easy ID; 9V bat; 2x3x4".

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"World Grabber." Put this handsome unit on your operating desk and *listen to the world!* Its performance rivals, even exceeds, reception from outside long wire antennas.

Unique tuned circuitry minimizes intermodulation distortion, provides additional RF selectivity, and reduces noise outside the tuned band.

Amplification also permits using the MFJ-1020 as a preselector with an external antenna, if you wish, for added versatility.

Covers 300 kHz to 30 MHz in 5 bands. Switch select .3-.7, .7-1.6, 1.6-4, 4-11, 11-30 MHz.

Adjustable telescoping antenna. Swivels for maximum signal, minimum noise.

Full controls for tuning, band selection, gain, and function (On-Off/Bypass). LED indicator. FET, bipolar circuitry. Phono jack provided for use with external antenna.

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than a few kHz. I suspect (your editor speaking) that both the KS and the Mizuho preselectors are tunable RF amplifiers, very useful, but lacking selectivity improvement. McKay Dymek has a passive (non-amplifying) preselector (Model DP-40) which I imagine has an attenuator network which does increase the selectivity. I do know that Radio West is preparing for the market a preselector which will both tune the antenna, amplify the RF signal and improve the selectivity.

The author of the article mentioned cautions the hobbyist that the control of his new rig marked "Preselector" is only an antenna tuner and will not replace an outboard preselector. I will keep the SDDXC members advised as to the RW super-dooper preselector. In the meantime, the KS Preselector can improve your reception. Did you know that KS stands for Kolb/Sanserino, two of the three electronic Musketeers that are responsible for Radio West goodies; Grant Manning being the third member and hard-working producer of the multiple know-how and the triple-brain.

For further enlightment, refer to Page 50 of the April SPEEDX and Page 4 of the April FRENDX.

Passive Preslector helps control cross modulation and bothersome MW blockbusters that crawl in where they don't belong. Sandy Blaize in the July SPEEDX diagrams a homebrewed "Bandpass Filter" easily assembled from Radio Shack parts that will help to dampen the products of these new "hot front end" rigs that interfere with good MW DXing.

A dollar bill to either SPEEDX or Sandy at 417 Ridgewood Dr., Metairier, LA 70001 will bring you the bulletin or the info

Mizuho SX-59 Preselector report by member Paul Kowalski of Milwaukee (See "Preselectors" in Bulletin 24.) The SX-59 is a true preselector, not just a preamplifier.

There is a set of tuned coils in both the input and output, tuning being accompliahsed by a 2-gang air condensor. The incoming signal is first tuned (before amplification) by a range selector switch then the VC1 ($\frac{1}{2}$ of the capacitor). The signal is then amplified and controlled by 2 cascade amplifiers and a source follower. Gain is variable 0 to 20dB. To cope with possible overload, there is a 20dB attenuator which can be cut in.

This, used in conjunction with the gain control, can manipulate a signal admirably. The signal then is fed into the output coils and tuned with the VC2, the other half of the capacitor.

The device will actually sharpen the RF selectivity to the extent where you must repeak every 5 to 10 kHz. However, don't expect it to cure the evils of an inadequate rig purchased from Thrifty Drugstore. Images go away nicely when your signal passes through Mizuho's magic box. For example, you have an annoying image on 6000 kHz. Shunt in the SX-59 and pick the image out. Now you can attenuate the wanted signal without bringing back the image. It even works with the Panasonic portables. Gilfer Shortwave quotes $87.00 for the SX-59.

Stephen-James Ltd., 47 Warrington Rd., Leigh, Lancas WN73EA, England. Model MK-2 Multi-tuner Antenna Coupler: 550 kHz to 30 MHz. Has 50 positions to match any antenna to receiver. £ 27.50. Model RX Band Pass Filter for audio: £ 30.45. Multifilter (similar to Autek QF-1A) at £ 15.75. S-J Preselector covers 1.6 to 31 MHz at £ 30.45. S-J Crystal Calibrator with 7 harmonics at £ 22.80. (Note: Exchange rate is approximately $2.40 to £.)

Not mentioned in the ANARC article is the Datong Model AD-170 Active Antenna covering 60 kHz to 70 MHz with an indoor 10 foot long dipole. Requires 12 VDC source. Costs £ 33.00. Datong products sold in the US by AR Technical Products Corp., PO Box 62, Birmingham, MI 48012.

Ameco Model PLF-2 Preamplifier: The PLF-2 uses a dual gate FET and comes in either 117 or 240 VAC models. Gain is greater than 20dB. Image and spurious rejection is claimed to be satisfactory. Covers 1.8 to 50 MHz. Prices at $49.95 in US. Ameco Publishing Corp., 275 Hillside Ave., Williston Park, NY 11596. Add $1 for shipping.

SCA (Subsidiary Communications Authorization): An interesting, but little-known, radio service that exists wherever FM radio stations operate.

Each FM transmission has a sub-carrier (the other sideband) which is filtered out in the reception.

This is utilized (in most cases) for private services which bring an added revenue to the station. The subcarrier transmissions include background music for stores and factories, Musak, talking books for the blind and handicapped, special network broadcasts to the medical profession, farm and market news, NBC, ABC and Mutual Network relays, telemetry and, in some areas, special services quite unusual. In fact, a new copyright law permits the services for the blind and handicapped (talking books) to use copyrighted works without permission or royalty payment and, in some cases, even hard core pornography is aired.

The establishments purchasing this sub-carrier air time sell or lease crystal-controlled receivers (untunable to other frequencies) and also charge a monthly fee. To warrant this fee they must deliver superior programming free of advertising.

The following material is taken from an article on this subject by Bruce F. Elving, Ph.D.: "Virtually ignored by the consumer press, by the HI-FI and stereo industry, and by FM listeners in general, is a medium of communications available free for the taking in almost all parts of North America--namely, FM sub-carrier broadcasting.

"In 1955, multiplexing of more than one program on a single station's carrier was authorized by the FCC. Eclipsed in the public eye by the development of FM stereo, sub-carrier FM has become the exclusive province of special interest groups. Although there is no law prohibiting the public from listening to the sub-carrier transmissions, the FCC has done everything possible to protect the interests of the subscribers, even to rather strong persuasion of Lafayette to discontinue marketing an FM receiver which includes reception of the FM sub-carrier.

"Listening to SCA is no more sinister than owning and using a police scanner or radar detector. However, the government does control where you may use these devices, prohibiting the use in private automobiles. Similarly, you should be able to listen to background music except in a business where you would be depriving a music company of their rental and fees.

"The sub-carrier transmissions are monaural and are as clear and reliable as your local FM station and are receivable up to the same distances as the regular FM signal. Almost any type of receiver capable of bringing in FM can receive FM sub-carrier by using a special adapter. If the receiver has a jack marked, "FM STEREO OUT," "MPX OUT," "4 CH MPX OUT," or "COMPOSITE FM OUT," you can connect the adapter without opening the cabinet. The output of the adapter may be connected to either the phono input jack of the same set or to an outboard amplifier. If your receiver has none of the above jacks, you must make your connection as instructed by the manufacturer of the device." (End of portion extracted from Elving's article.)

Bruce Elving, PO Box 24, Adolph, MN 55701, publishes the FM Atlas & Station Directory which lists main channel and SCA activity. The price is $3.95 ppd. Mr. Elving also supplies SCA adapters and SCA modifications. Write for information.

Grant Manning of Radio West advises that he shortly will also have available SCA adapters. An SCA adapter costs in the neighborhood of $25 to $30. Your President has one on order and as soon as it arrives the price will be announced as well as a report on what can be heard from the Club's QTH. Club member Albert Lobel also has one of the Supersnoopers (adapter) and reports reception from as far away as Los Angeles. He uses only an inexpensive AM/FM drug store portable.

A 3 page article on the same subject, and also by Bruce Elving, appears in Glenn Hauser's RIB of February 1979. Watch SDDXC Bulletins for further dope on SCA.

FM Atlas SCA Adapter: (See Page 3, Bulletin 10 article.) The SCA Adapter enables one to receive subcarrier signals transmitted by most FM broadcasting stations. These transmissions consist of easy listening music (Musak) supplied to stores and factories, a medical network, talking books for the blind, etc.

The device listed/reviewed here costs $24.50, comes in plastic box about the size of a sardine can, has a switch, two leads with plugs and a 9 volt battery.

One lead plugs into the microphone or auxiliary jack of my FM receiver (a Panasonic RF-1170), and the other plugs into the Multiplex jack (see Bulletin 10 for connection details). My QTH is Imperial Beach, and I am able to receive 3 San Diego and 2 Tijuana SCA signals. Both Tijuana signals are Musak, as is one of the San Diego FM stations. KPBS of San Diego carries a program for the handicapped including talking book. and KYXY transmits the medical program called "Network of Continuing Medical Education." All signals come in loud and clear. I am using only the whip antenna of the FM portable and don't know how much further I could reach with an outdoor FM antenna. Club member Albert Lobel reports reception from Los Angeles (from the North County). There is some cross modulation, but it doesn't interfere with the receivable signals.

The five stations referred to above are: KPBS 89.5 MHz, shut-in programs; XHIS 90.3 MHz, Musak; KYXY 96.5 MHz, NCME; KOZN 103.7 MHz, Musak; and XHERS 104.5 MHz, Musak.

Adapter Kit	$13.00
Factory Assembled	18.00
In plastic case w/switch, battery & leads w/plugs	24.50
Installation at Factory	10.00 labor
Super Snooper complete w/ amplifier & speaker	26.00
Same w/output jack	29.00
FM Atlas listing SCA Xmtrs	3.95
FM Stereo X-pander (FM antenna booster)	19.00

The Club has a list of FM receivers to which the adapter may be connected without modifications or delving into the innards. A phone call to 714/429-9728 will do the trick.

I had best explain that the basic kit is just that, and it requires a switch, battery (or receiver current) and your connection to the receiver. The assembled kit in the plastic box comes ready to plug into your receiver. When ordering, report name and model of your FM receiver. It will then have the proper plugs. The Super Snooper has its own amplifier and speaker and can be connected to any FM rig that has an earphone jack. The $10 installation charge is for labor but does not include shipping both to and from the factory.

Further Dope on SCA Adapters: (See Page 1 in Bulletin 12.) Since purchasing the Atlas Adapter evaluated in the Bulletin, I have discovered the existence of a more sophisticated device which will probably give better results. I refer to the "SCA Multiplex Adapter" manufactured by Southwest Technical Products Corp., 219 W. Rhapsody, San Antonio, TX 78216. It sells for $29.95 ppd. I quote from the STPC catalog, "Use of the 'phase locked loop' system results in a circuit with superior rejection of unwanted interference, better fidelity and requires no inductors or tuned circuits." Although it did not seriously affect the obtainable SCA signals on the Atlas device there was cross modulation and interference.

HI-FI Sound for your TV: Member Albert Lobel has written a very informative article in reply to my "Help Wanted" item in Bulletin 16. I am not going to use the article verbatim as Albert (although he warns strongly against do-it-yourself modifications and the danger of 115 VAC) does suggest that his idea can be home-brewed. It is just too dangerous to do the job yourself as TV circuits have very high voltages, and some TVs have a chassis ground which is one side of the 115 VAC circuit which means one lead of the speaker is hot. You can inadvertently feed raw house current into your Hi-Fi rig and electrocute the whole family by thus connecting the metal cabinet of your tuner/amplifier to one side of the 115 VAC line.

As stated in my original article, and as repeated by Albert Lobel, TV audio leaves the station as high fidelity FM mono. In most cases its quality is then ruined by inferior amplification in your TV set and/or by the dime-store speaker jammed into a tiny space in the TV cabinet.

It is a simple matter to extract the sound from your TV and amplify it, playing it through stereo speakers if you have a Hi-Fi system. It is simple but dangerous for anyone other than an experienced TV technician. If your TV set has an earphone jack, you have it made. All you need is a "Y" patch cord (at Radio Shack) with proper fittings. If your TV doesn't have the 'phone jack you will need to have a TV technician install one for you. You will require a jack with a switch to disconnect your TV speaker when feeding audio to your tuner/amplifier of the Hi-Fi rig.

This jack, mounted on the back of the TV, should be wired into the audio circuit of the TV ahead of the amplifier or spliced to the TV speaker's leads, depending upon the quality of the signal. This can be determined by trial only. Try the speaker leads first. The switch should cut into one speaker lead in the TV. Don't attempt this job yourself unless you know what you are doing, and don't get your radio "expert" nephew to do the job. You may end up with a fried nephew and strained family ties. It's dangerous in there.

With the jack installed, connect the plug of the single lead of your "Y" patch cord to it and plug in the other two leads to your AUX jacks on the rear of your tuner/amplifier. You won't get stereo sound, but both speakers will deliver audio like you never heard before on TV.

Since writing the "Help Wanted" article I have checked out AM/FM/TV radios available at the local emporiums. They sell for from $29.95 to $49.95, and the TV section appears to be largely a sales gimmick. None of the sets include the UHF TV stations. It was a good idea, but Albert's is better.

Advantages of Using a Microwave Oven instead of wood smoke in shrinking heads. The process remains the same where the skull is broken, so the pieces can be removed through the neck opening.

The eyes, nose and mouth must be sewn closed. The inside of the skin must be well-scraped of fat and membranes. The skin is then packed with damp sand and the features formed with your fingers. Placed in the microwave oven, the shrinking process can be watched through the window in the door. The head must be removed from the oven frequently to reshape the features as the sand is forced out with the shrinkage.

The big advantage of the microwave oven is that the process is speeded up and the skin is not blackened with smoke, therefore it and the hair retain their natural color. Also, the skin remains supple and is easily molded. However, this is one problem: If you are shrinking your mother-in-law's head, and she has that blue hair so popular with the elderly, the microwave will turn the silver blue into a brilliant blue-bird color which is unnatural. Don't attempt to mold in a smile as the lack of teeth will produce only a grimace, a natural expression of mother-in-laws.

You are warned not to allow Junior to watch the process through the oven window because, as the shrinking takes place, the expression changes and will sometimes scare the be-Jesus out of the lad (lass.)

I would like to call your attention to the fact that in no other hobby bulletins will you find informative articles like this. (Thank God)

String Operated Dial Mechanisms: Some of the older rigs use string under tension to operate dial controls. Slipping can be corrected by applying violin resin to the string.

Inexpensive Ceramic IF Filters are available from Mallor Co., Box 1284, Indianapolis, IN 46206 at very reasonable prices. It's best to send for a catalog to check shape factors.

Dust Covers in heavy gauge vinyl for your equipment can be ordered direct from Covercraft, PO Box 555, Amherst, NH 03031. There are sizes in stock to fit most receivers, but it is best to specify wanted size. Cost is $4.95.

Modifications: Most receivers are a compromise between what can be produced and what the manufacturer's budget is. There are no secrets of design so cost is based on the components. Unfortunately, the most essential feature (selectivity) is the most expensive to produce. A receiver's selectivity is controlled by filters in the IF circuit and three types are available: ceramic, crystal and mechanical (with cost in that order.)

The effectiveness of a filter, or its ability to permit only the desired signal to be heard with the least interference from nearby signals, is rated as "Shape Factor." This means the "steepness" of the "skirt" as measured at 6dB and 60dB (decibels). A filter rated at 4 kHz at -6dB and 10 kHz at -60dB has a shape factor of 2½ to 1 (2½ x 4 = 10). This is only fair and means rejection of signals as close as 5 kHz is only possible when the offending station is low power. The 1.8 to 1 is considered good.

Unfortunately, only expensive mechanical filters are capable of this. Collins mechanical filters sell for about $85.00 each (not installed). In comparison, a ceramic filter of the same frequency, but with an inferior shape, runs about $40.00 installed.

Because of cost alone, only the most expensive receivers are equipped with mechanical filters. That means the hobbyist with a medium-priced rig is faced with the necessity to modify to realize the full capability of his radio. This can cost from $40.00 to many times that depending upon what you want and your pocketbook. Even a $40.00 filterectomy can improve most medium-priced rigs but true joy is only possible with the mechanical filter.

Other modifications include outboard digital frequency displays (highly desirable, but expensive, running considerably beyond $100), improved AGC control (automatic gain control of signal fading) and the addition of LW capabilities.

An example of good modification is the upgrading possible with an FRG-7, a basically fine receiver, with a sharper IF filter, a digital readout, a fine tune control and improved audio, making it equal to, but less costly than, the newer model FRG-7000. Another example is the added desirability of the Panasonic portables RF-2200, RF-2600 and RF-2900 when modified with better filters.

Modifications are best left to experienced technicians and/or firms specializing in this type of work. Radio West (see advertisement facing Page 160) is expert in this field, and hobbyists can send equipment by UPS with full confidence and assurance of fair treatment. Another capable technician is Sandy Blaize of 417 Ridgewood Dr., Metairie, LA 70001.

Members, please send in additional names and addresses of individuals and dealers that you have had good luck with.

- INTERNATIONAL -
DXER'S CLUB OF SAN DIEGO

(Ex-San Diego DXer's Club)
A non-profit organization.

Larry Brookwell, President
Telephone: 714/429-9728

1826 Cypress St.,
San Diego, CA 92154 USA

An international hobby club dedicated to SW listening and DXing. Publishes a monthly Bulletin which keeps abreast of the development of the hobby, the equipment and the experimenter, in non-technical language; reports newsworthy items relative to all branches of the hobby, the industry and the ever-changing technology; lists equipment sources and service facilities, advising of special offers and discounts; publishes user reports and critical evaluations of new and older equipment and discusses options and modifications. Offers a monthly feature free to members listing items for sale, swap or wanted. An active member-participation sharing both problems and successes. Usual SW loggings and QSL lists left to the clubs that feature them. Club activities and Bulletins include SW listening and DXing of LW, MW, SW, TV, RTTY and scanning and the gear required for these interests.

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SDDXC is an exclusive club where members receive personal attention and are not just numbers. Assistance is available in choosing equipment, antenna problems, technical aid and beginner's questions. Members are encouraged to report experience with receivers, accessories, dealer and/or service facilities, hobby news and even gripes.

Membership requirements are the fee, your name and address, age, receiver(s) and antenna(s) in use and your special SW interests. Everyone is welcome.

Note: IRCs accepted as payment at 30¢ US each.

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